WCB
Ice Cream A/S

An Alliance Company

Project	:	MF 600 GA
Customer	:	
Machine type	:	MF600 GA V3.0
Constructor	:	JRO
Manufacturing date	:	27. Maj. 2005

Type	: MF 600 GA
Supply voltage	: 3 X 400 V + N + PE / 50Hz
Control voltage	: 24 Vac/Vdc
Order No.	: D58175

Colours for internal wiring

Power circuits:

0 VAC	Neutral	Neutral conductor	Light Blue
230/400 VAC	Phase	Phase conductor	Black
	PE	PE WIRE	Green/Yellow

Control Circuits:

0 VAC	Ref.	Neutral conductor	Red
230 VAC	Phase	Phase conductor	Red
0 VAC	Ref.	Neutral conductor	Red
24 VAC	Line	Line conductor	Red
0 VDC	Ref.	Ref. conductor	Blue
24 VDC	Plus	Plus conductor	Blue
		External	Orange

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WUPJ002E 01.03.1994

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DWG No. D58175

WCB

WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N. DENMARK

Rev.	Const.	Date
A		
B		
C		
Made	JRO	25. Aug. 2005

DRAWING LIST

Customer

Drawing No. D58175

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WCB Ice Cream A/S

An Alliance Company

Type	:	MF600
Year	:	2005
Ue	:	3 x 400V+N+PE / 50Hz
Ie	:	42 A
Imax	:	63 A
Ic	:	50kA
P	:	20.2 KW
Drawing No.	:	D58175

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WCB

WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

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TYPE PLATE

Customer

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WCB Ice Cream A/S

An Alliance Company

Type	:	MF600 NH3
Year	:	2005
Ue	:	3 x 400V +N+PE /50 Hz
Ie	:	20 A
Imax	:	32 A
Ic	:	50kA
P	:	8.9 KW
Drawing No.	:	D58175

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WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

Rev.	Const.	Date
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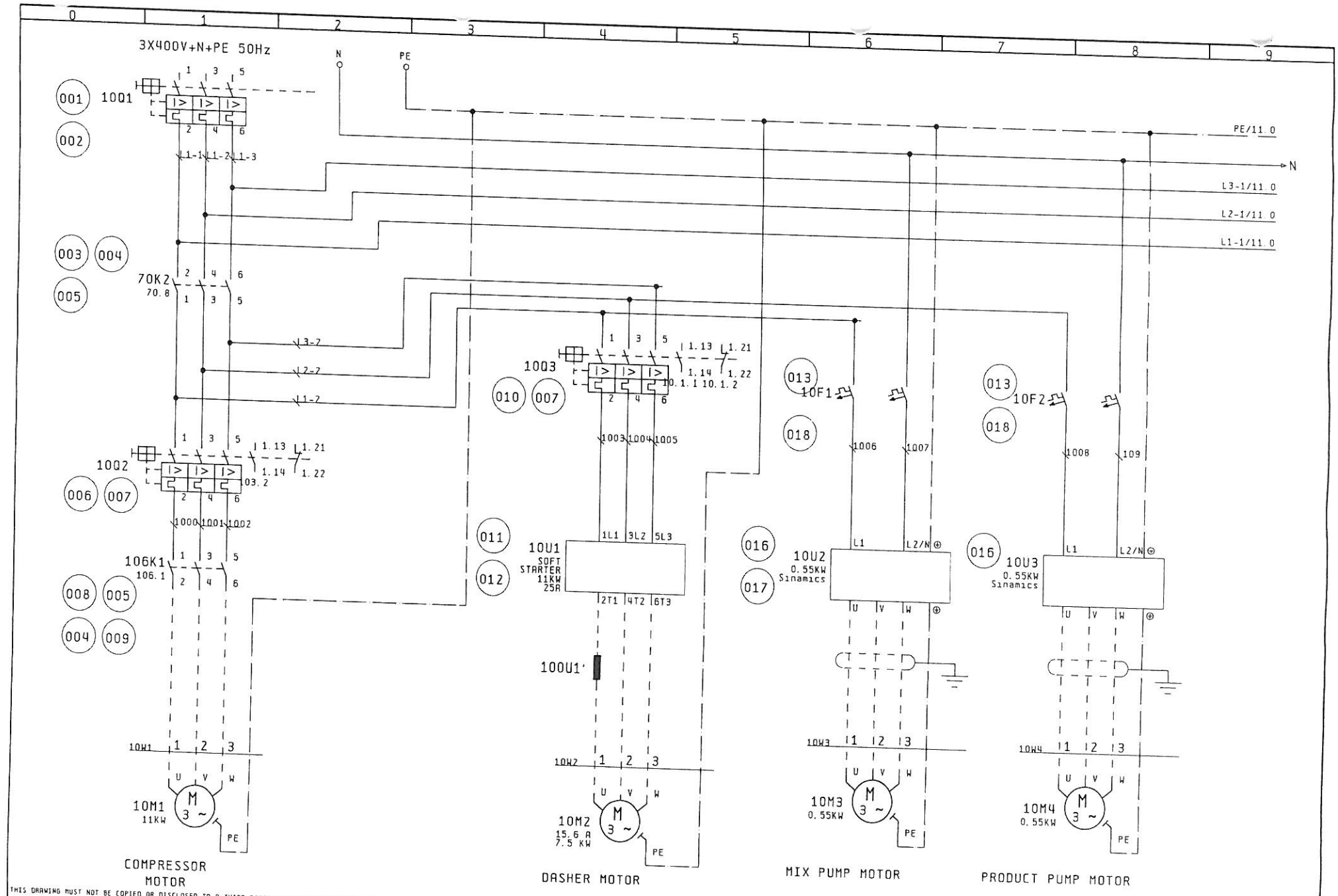
Made	JRO	01. Sep. 2005

TYPE PLATE NH3

Customer

Drawing No. D58175



DWG No. D58175

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GRAHAM BELLS VEJ 6
DK-8200 AARHUS N. DENMARK

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Madd	MIJ	19. Sep. 2005

MOTOR MAIN CIRCUITS
FREON MACHINES

Customer

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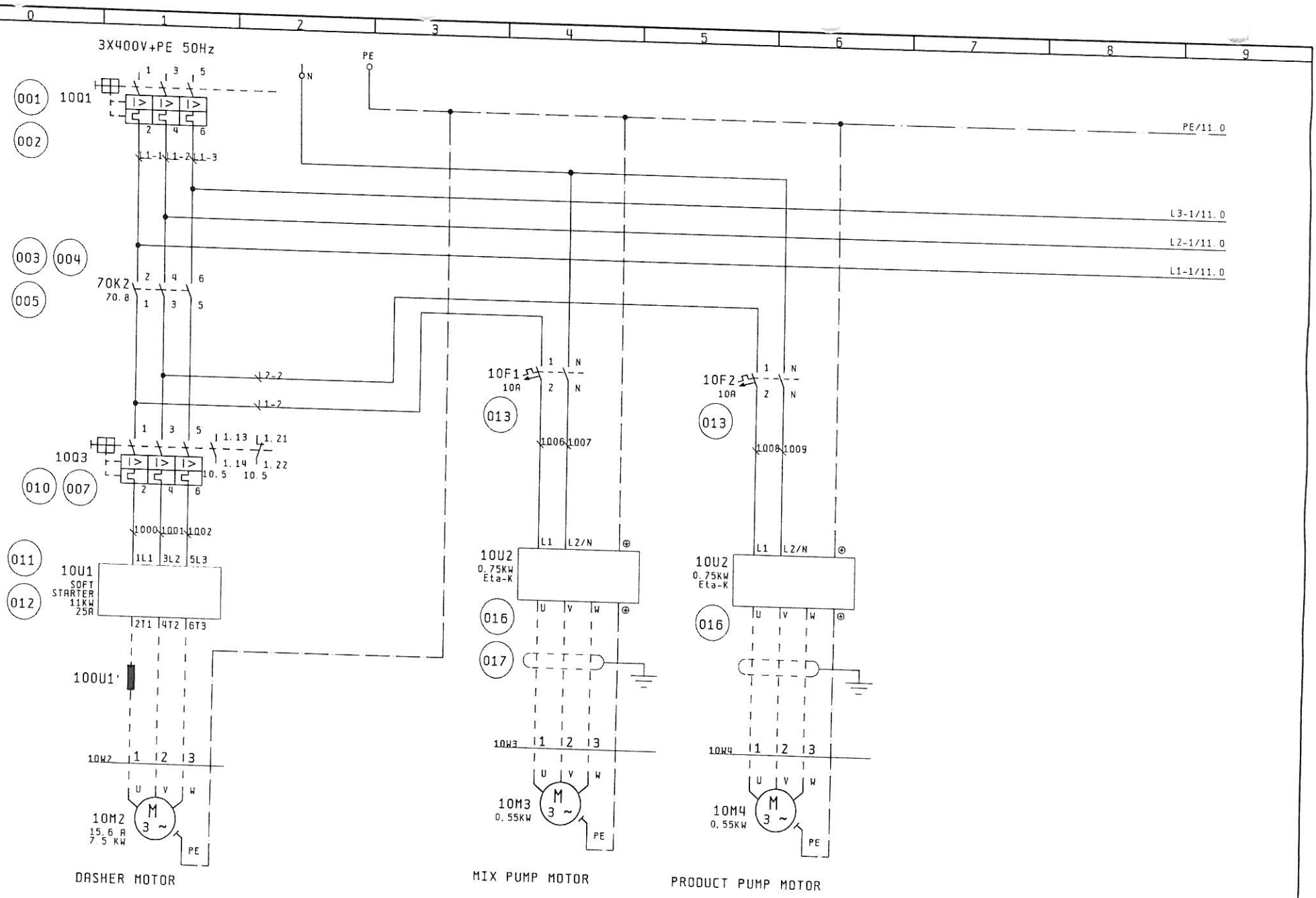
10.1



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GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

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MOTOR MAIN CIRCUITS
NH3 MACHINES ONLY

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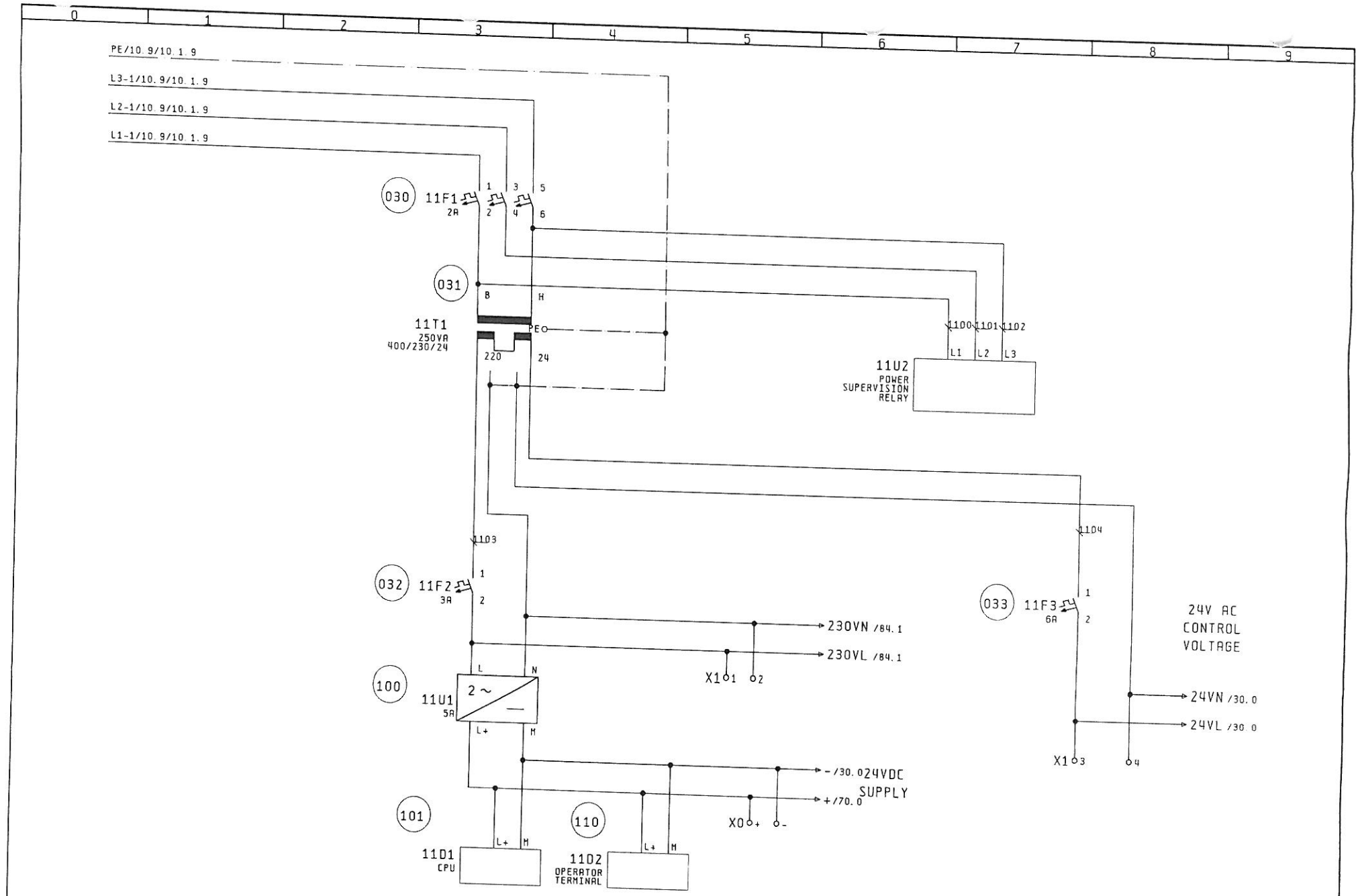

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230Vac, 24Vac AND 24Vdc SUPPLY

Customer

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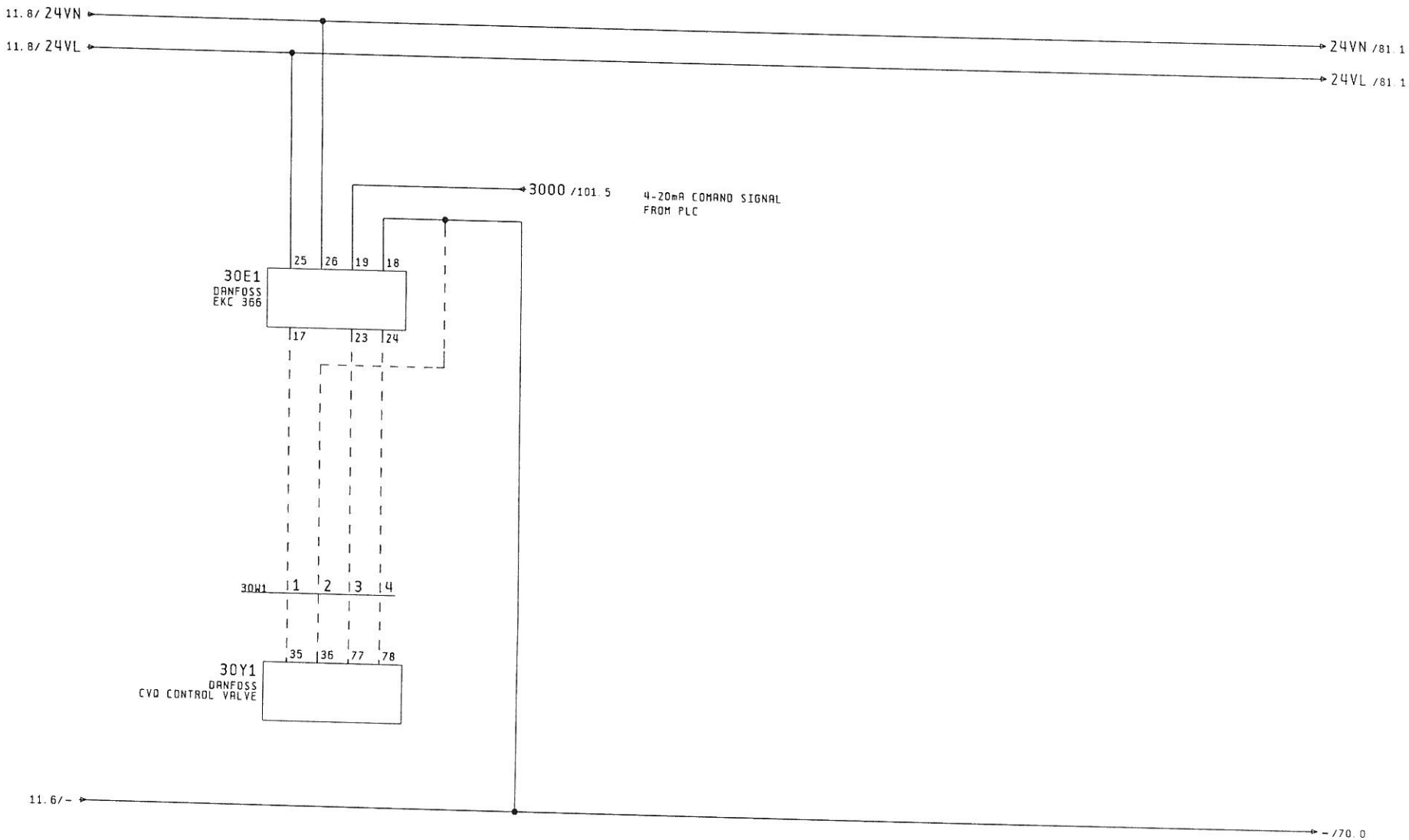

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DANFOSS CVQ CONTROL VALVE

Customer

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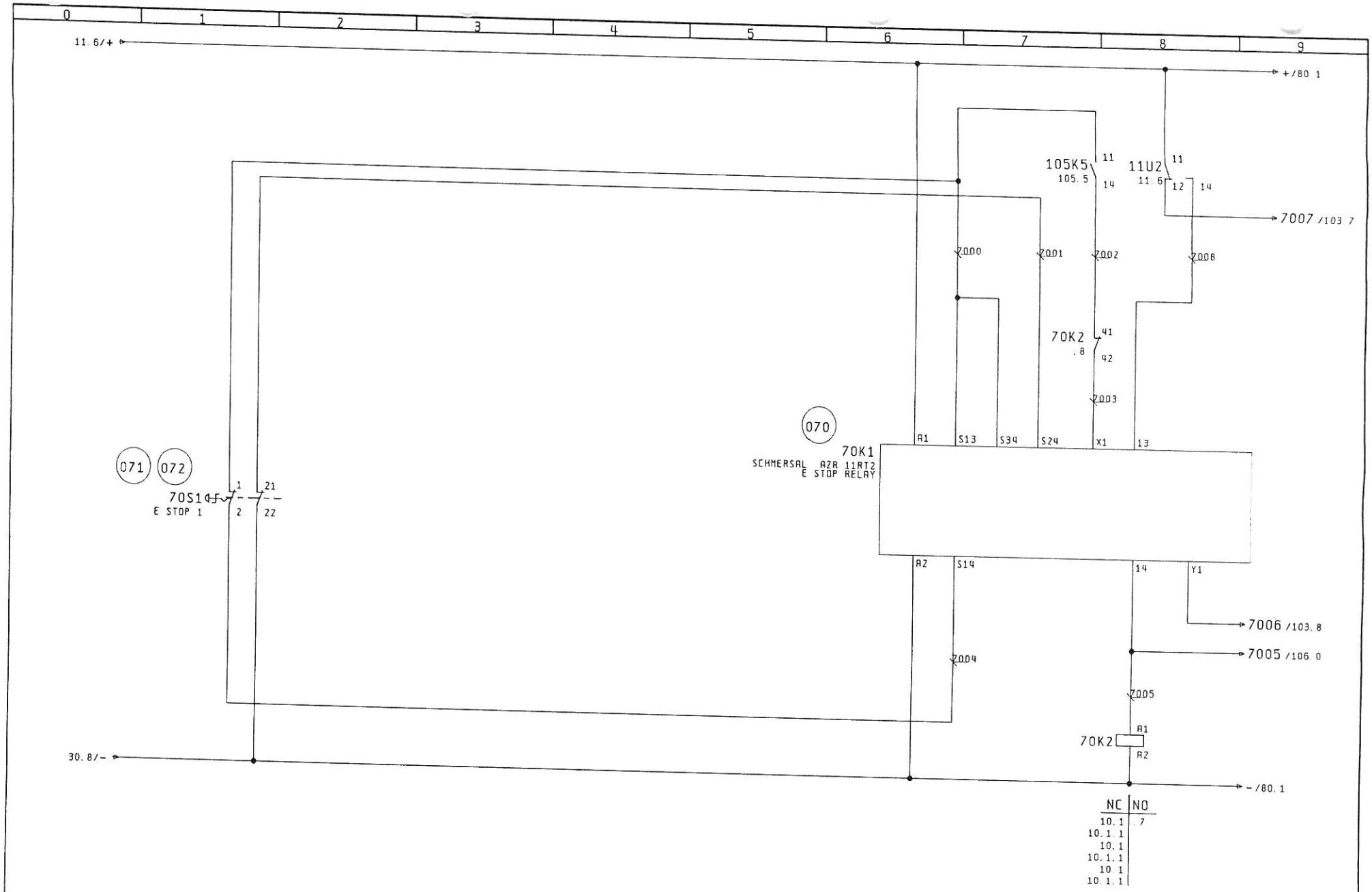

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GRAHAM BELLS VEJ 6
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EMERGENCY STOP
RELAY

Customer

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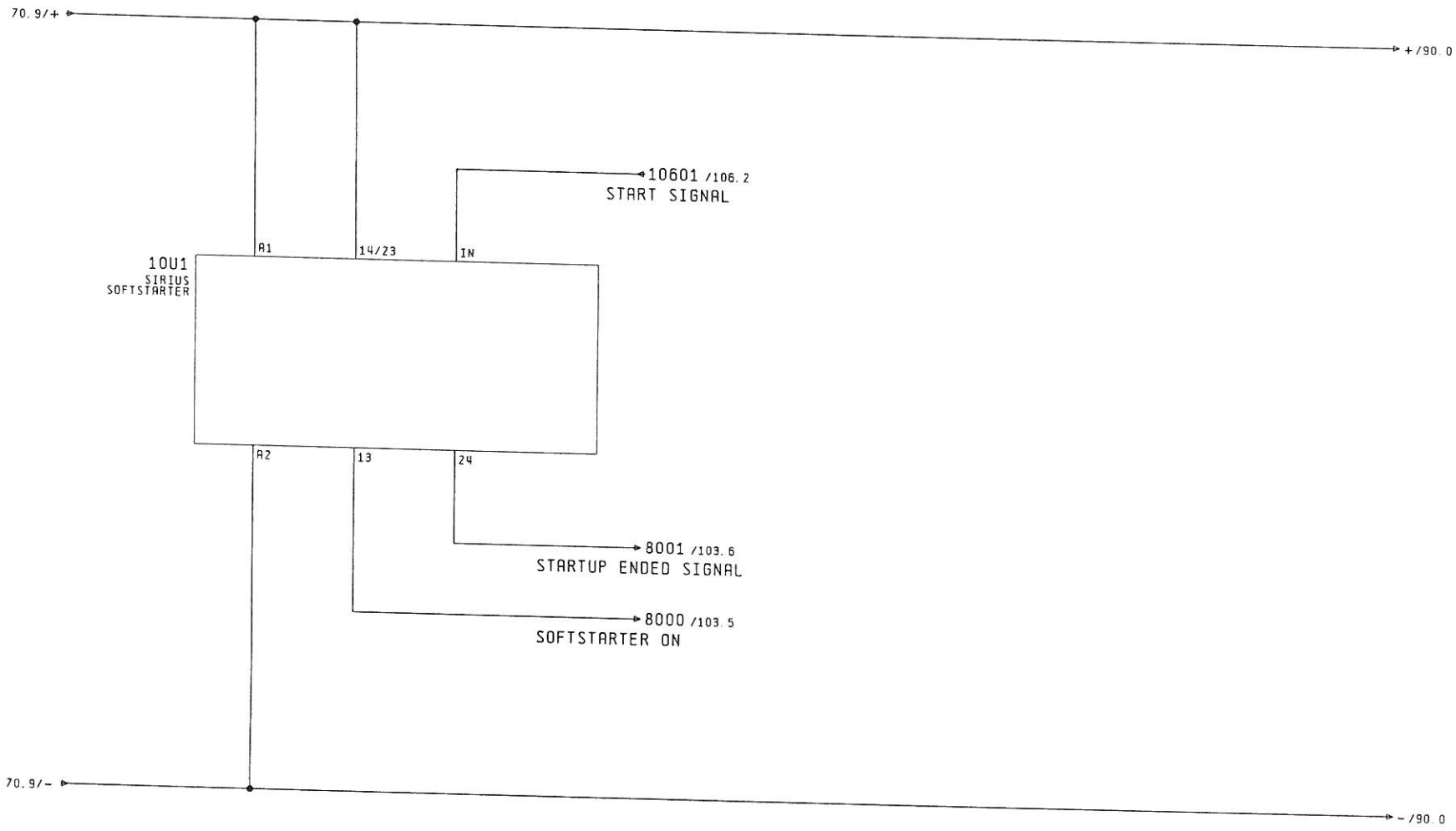

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GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

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DASHER SOFTSTARTER
CONTROL CONNECTIONS

Customer

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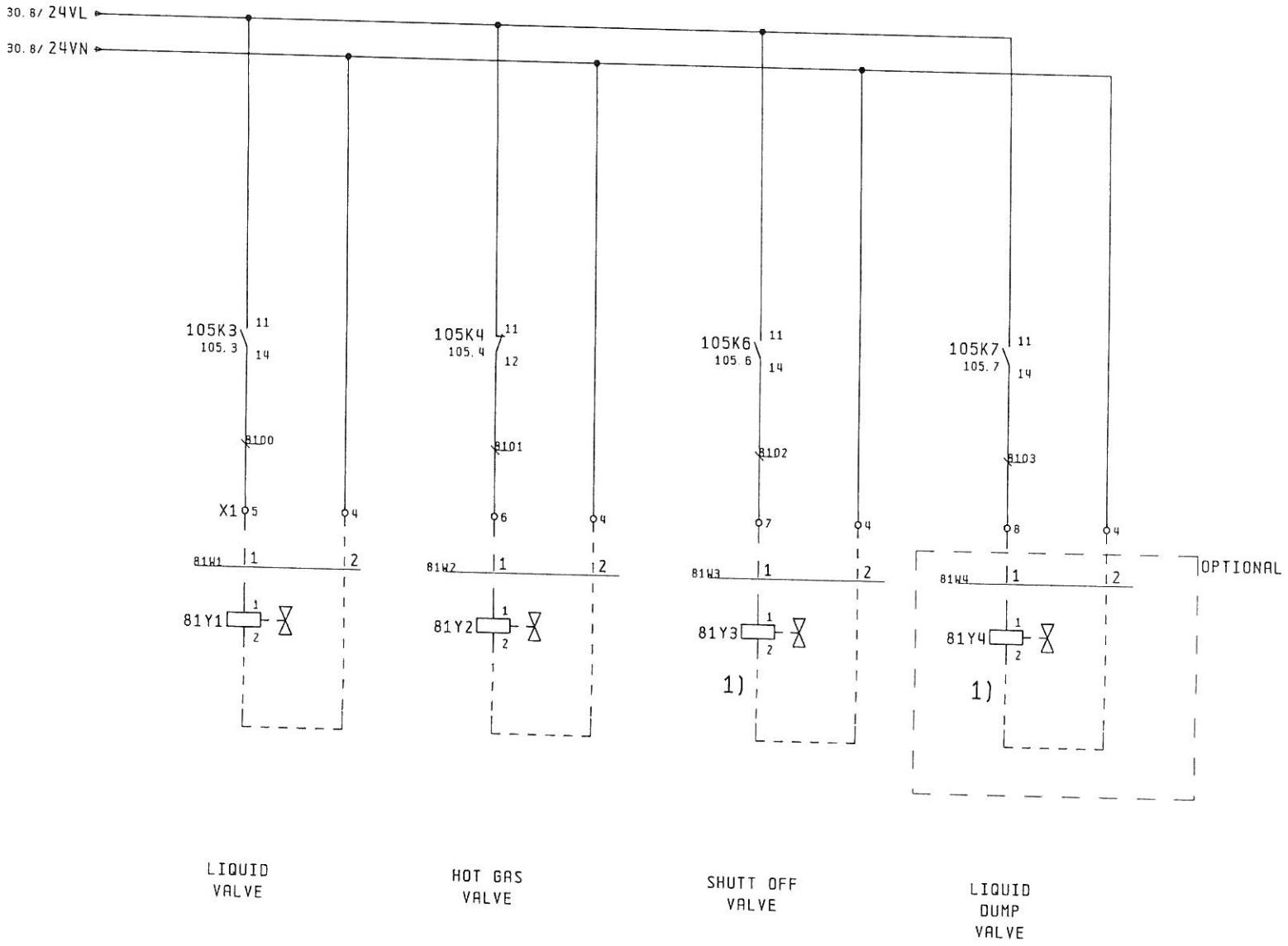

1) NH3 MACHINES ONLY

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GRAHAM BELLS VEJ 6
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REFRIGERATION VALVE CONTROL

Customer

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84

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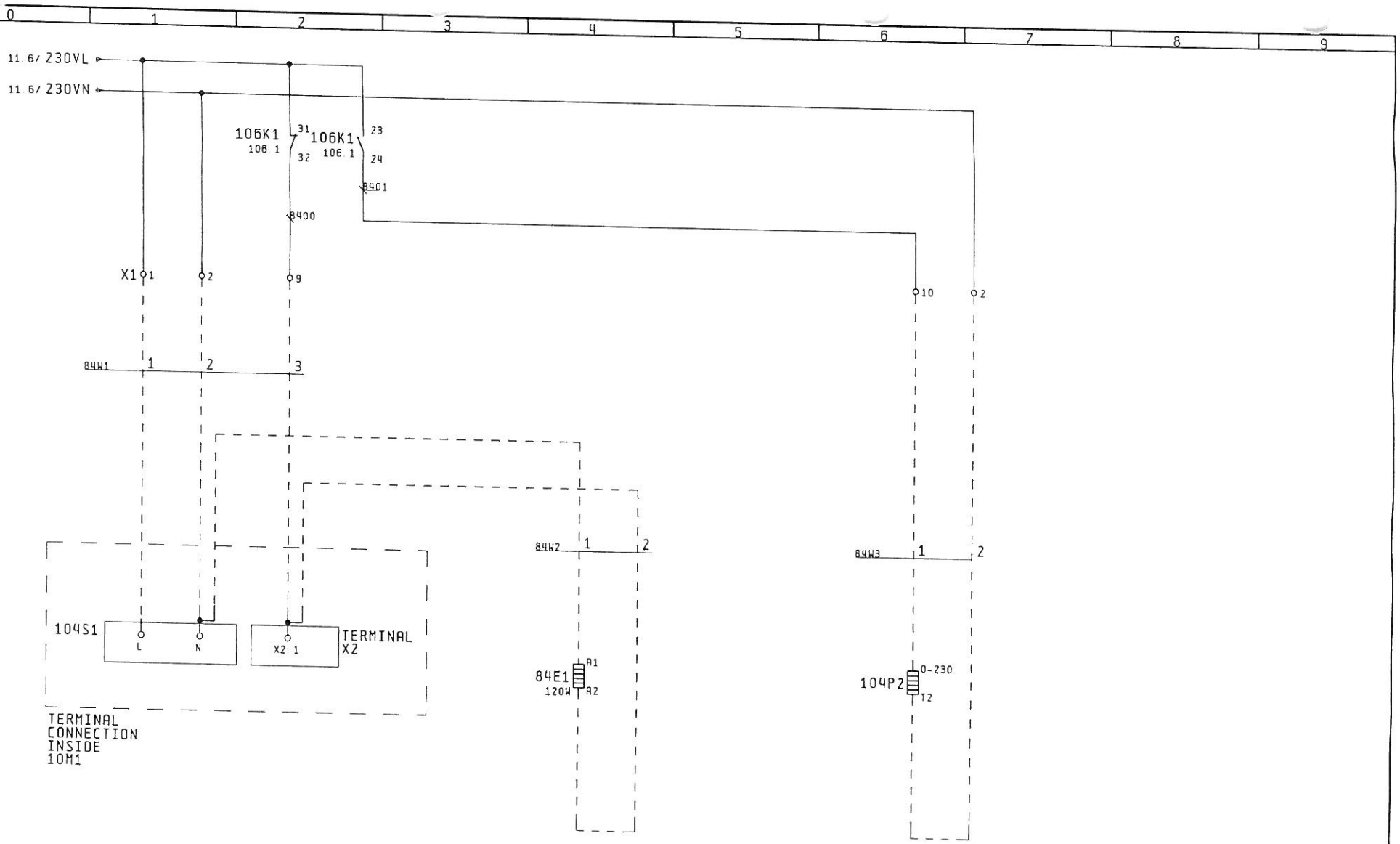

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GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

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230VAC AUXILLAR CIRCUITS
BITZER COMPRESSOR

Customer

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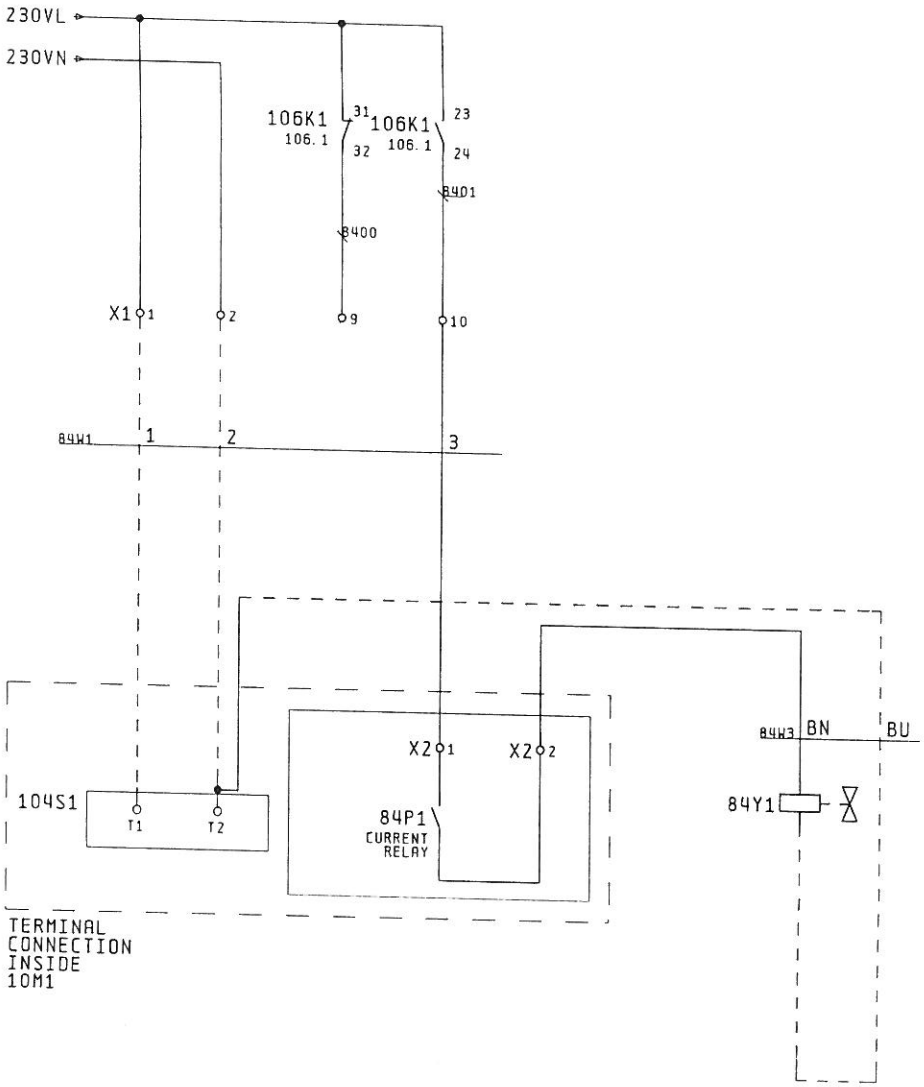

POWERSUPPLY FOR
THERMAL PROTECTION
IN COMPRESSORMOTOR

AUXILLARY
LIQUID SHUT OFF
VALVE

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230VAC AUXILLAR CIRCUITS
COPELAND COMPRESSOR

Customer

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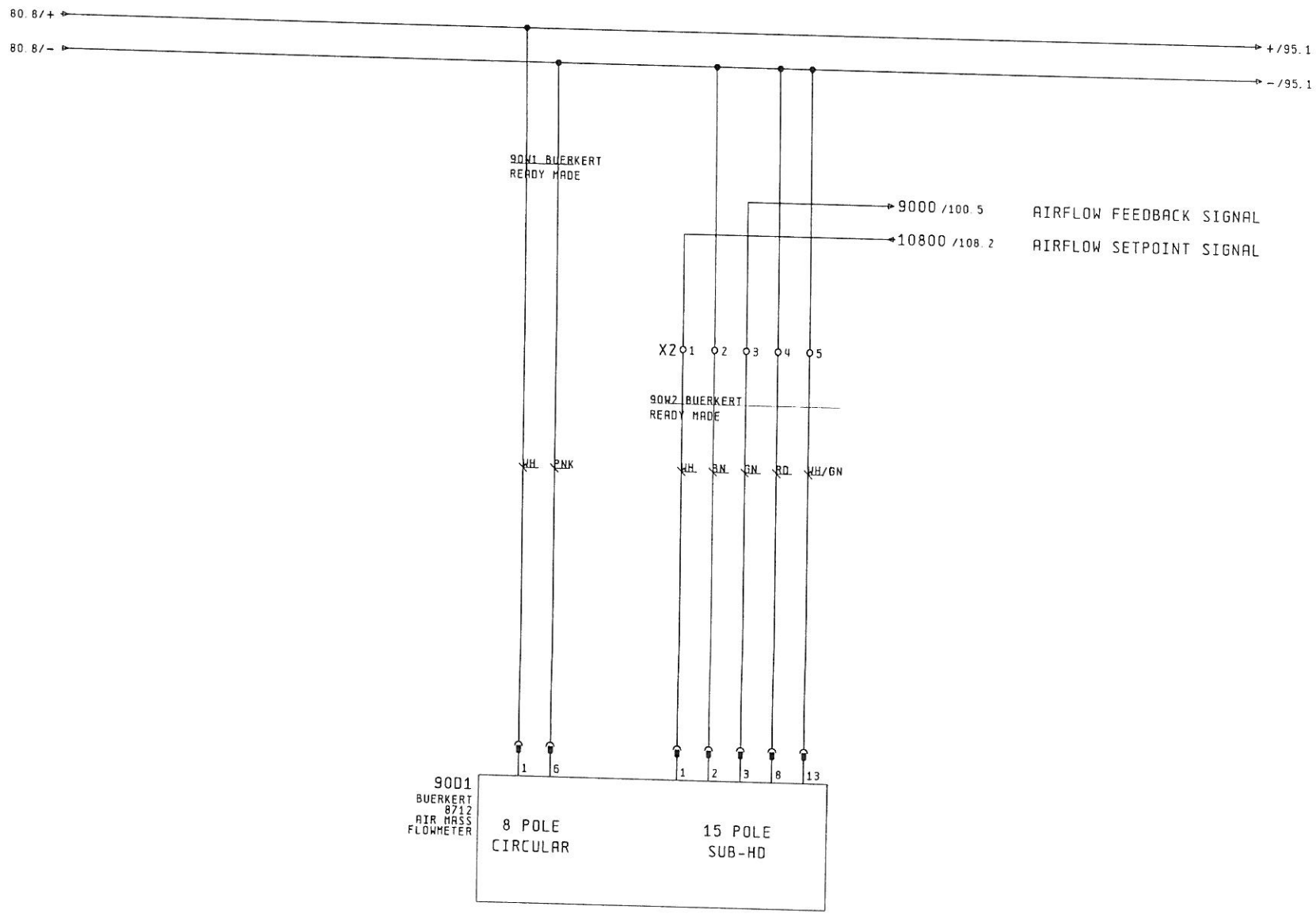

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GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

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CONNECTION OF AIR FLOW METER

Customer

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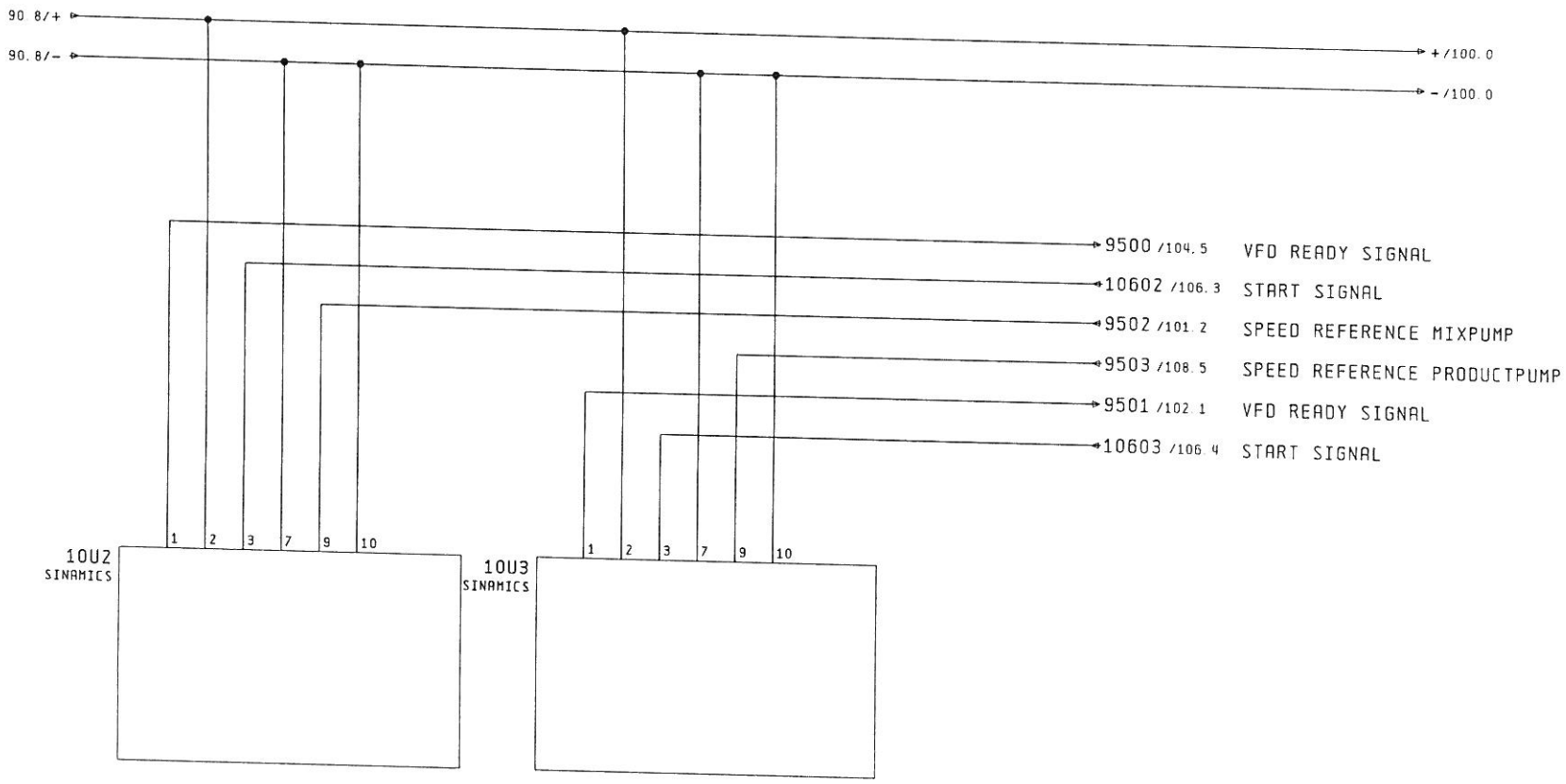

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CONTROL SIGNALS
PUMP INVERTERS

Customer

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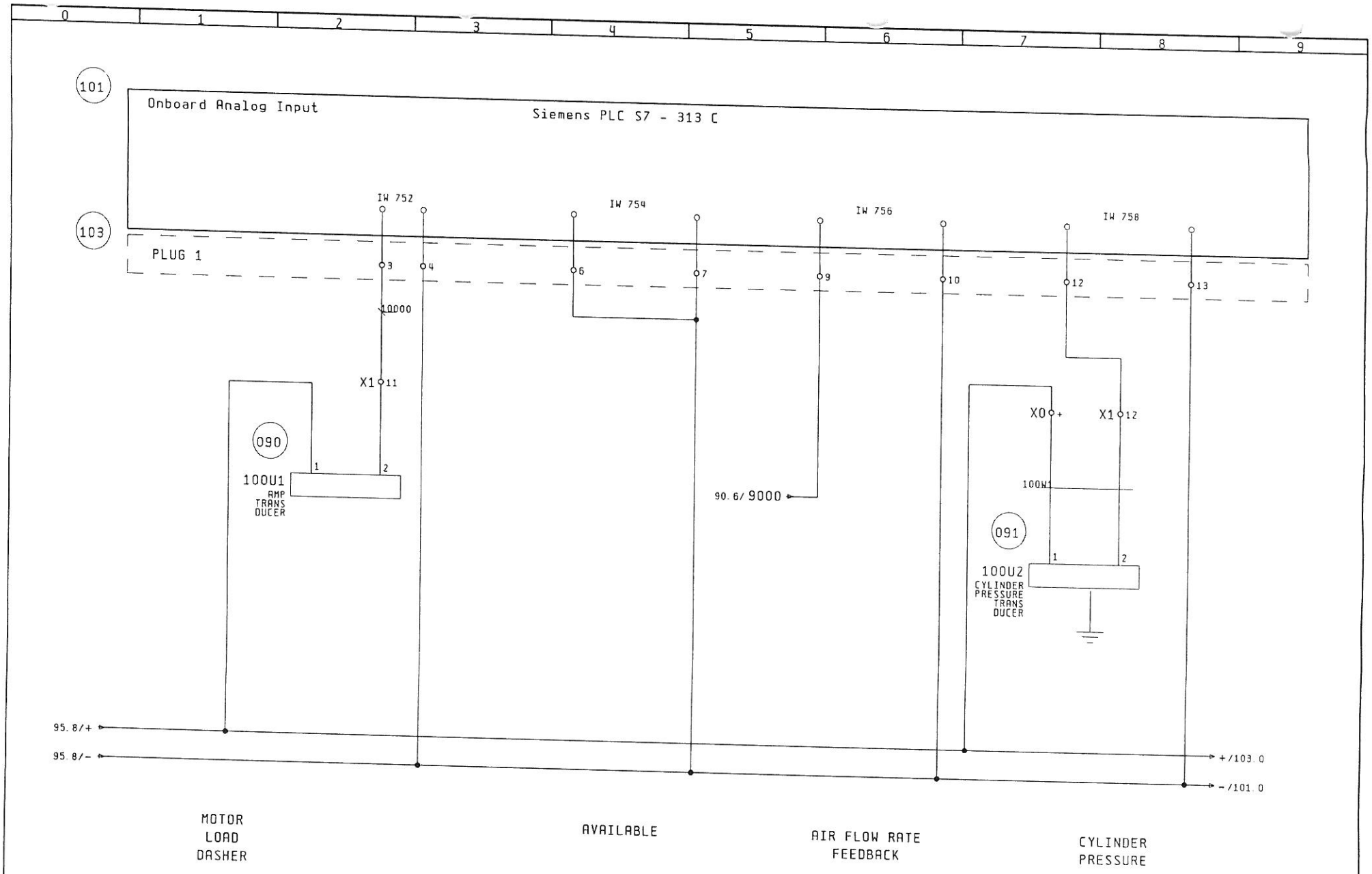

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GRAHAM BELLS VEJ 6
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ANALOG INPUTS IW 752 - IW 758

Customer

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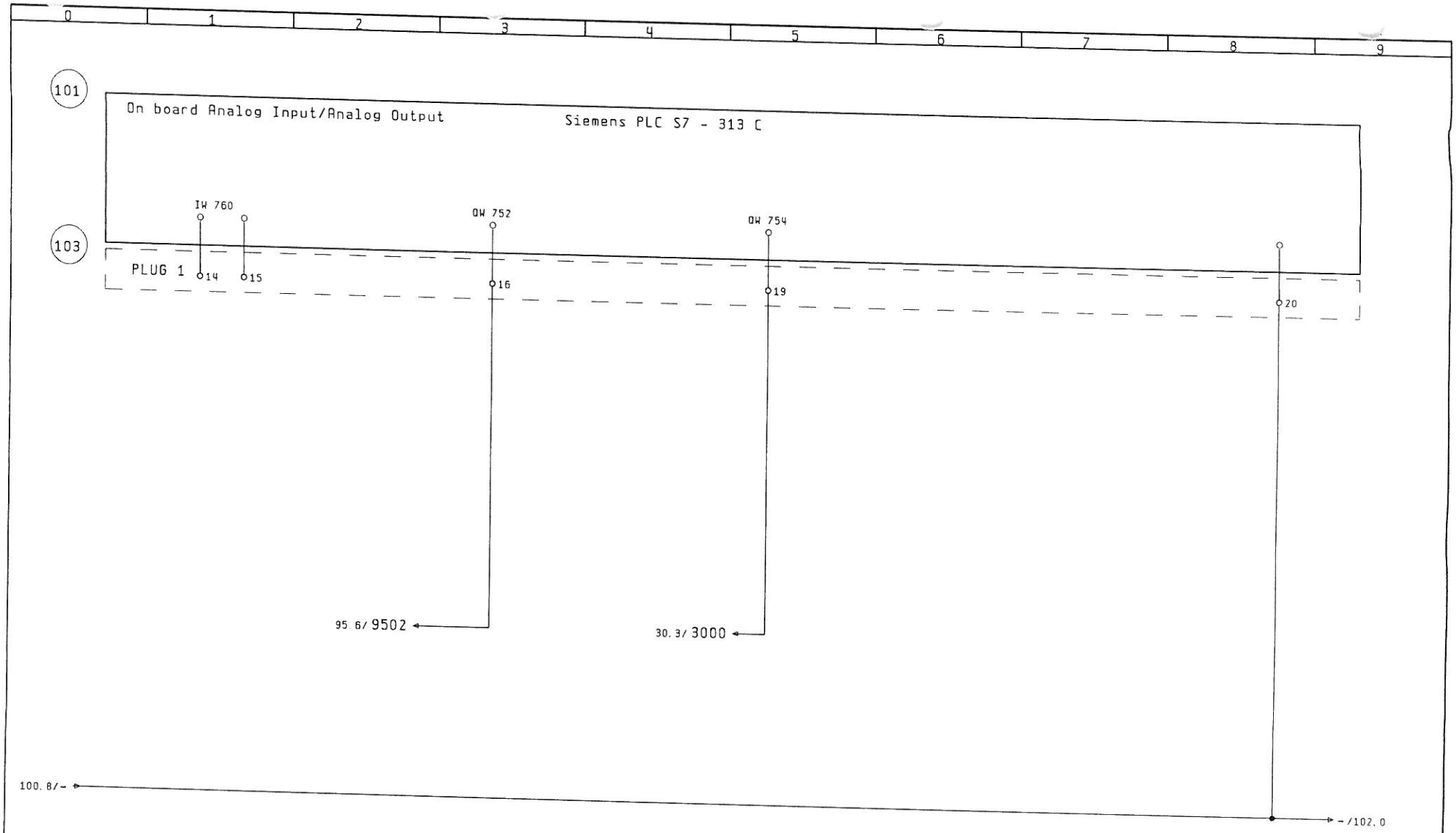

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GRAHAM BELLS VEJ 6
DK-8200 AARHUS N. DENMARK

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ANALOG IN. IW 760
ANALOG OUT. QW 752 - 754

Customer

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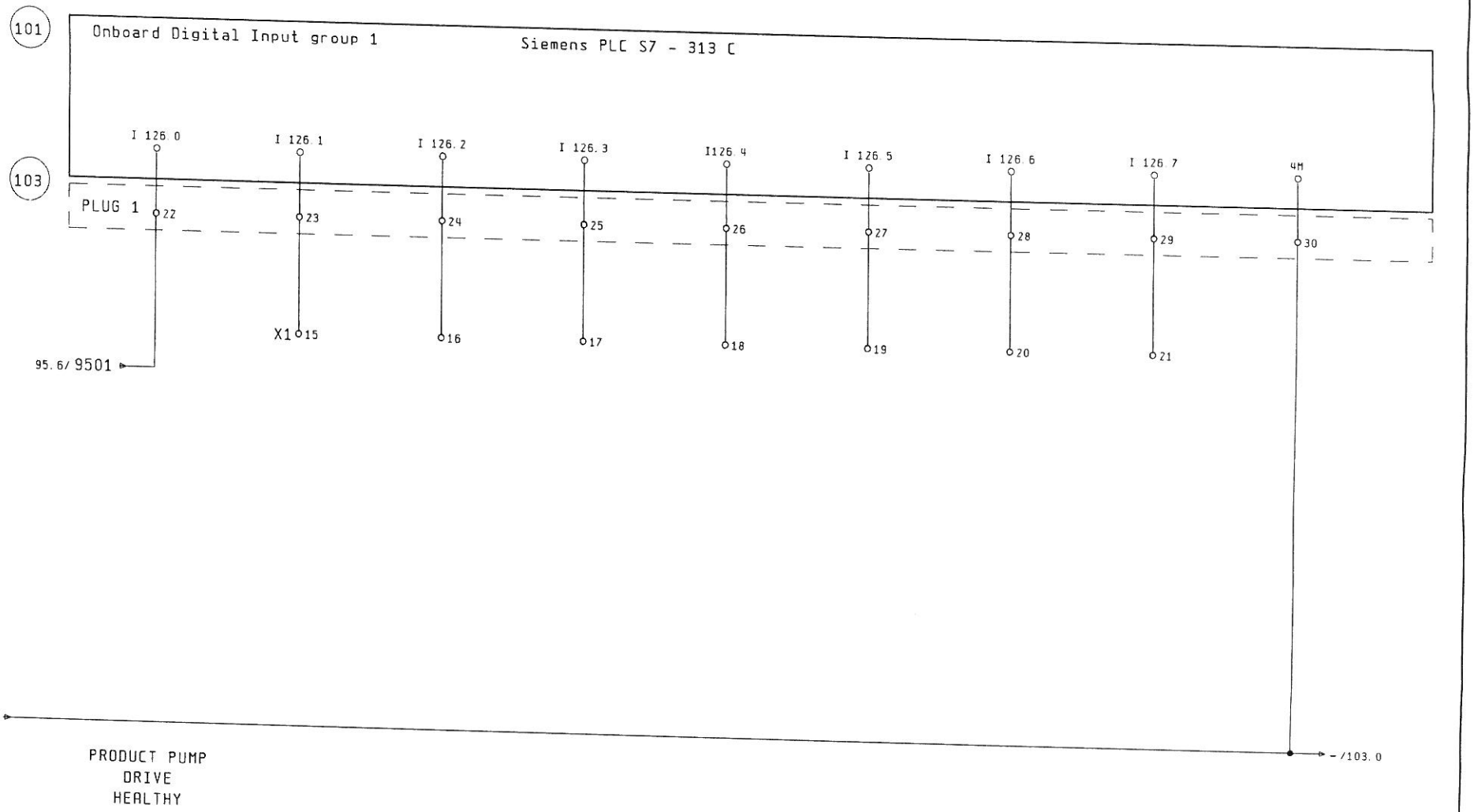

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DIGITAL INPUTS
I 126.0 - I 126.7

Customer

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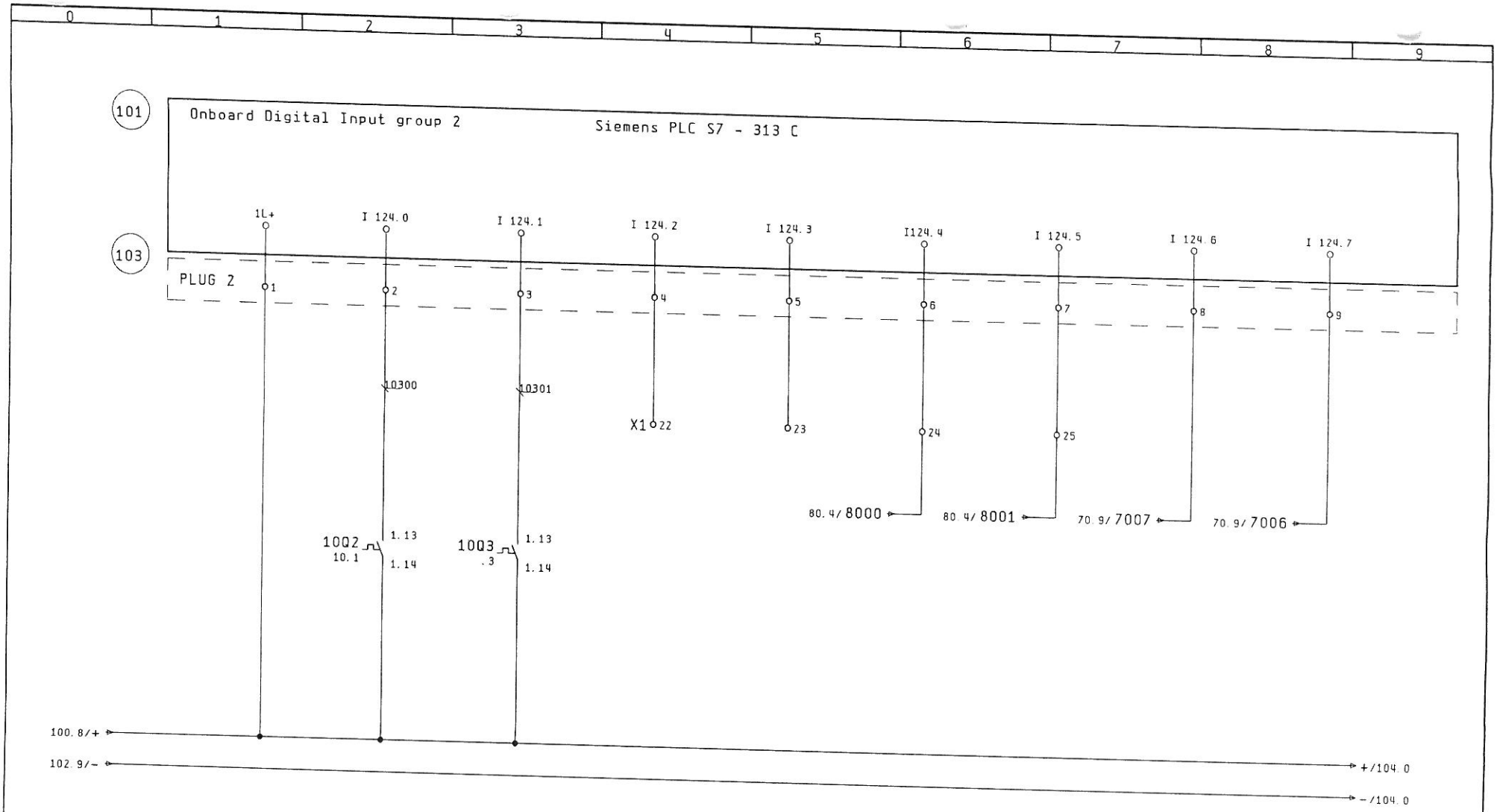

1) NOT NH3 MACHINES,
INSTEAD WIRE INPUT TO +

DWG No D58175

WCB

WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N, DENMARK

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DIGITAL INPUTS
I 124.0 - I 124.7

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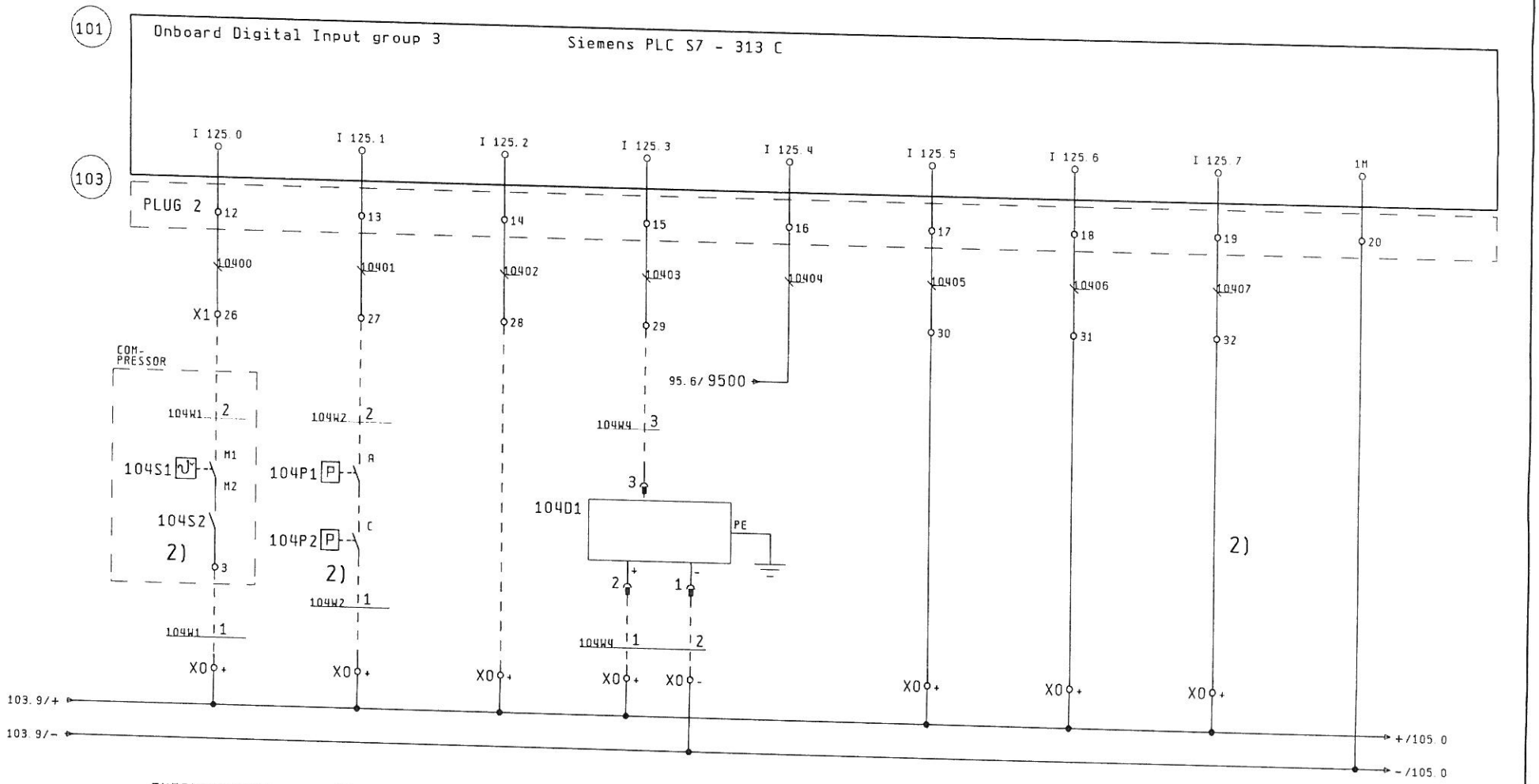

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GRAHAM BELLS VEJ 6
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DIGITAL INPUTS
I 125.0 - I 125.7

Customer

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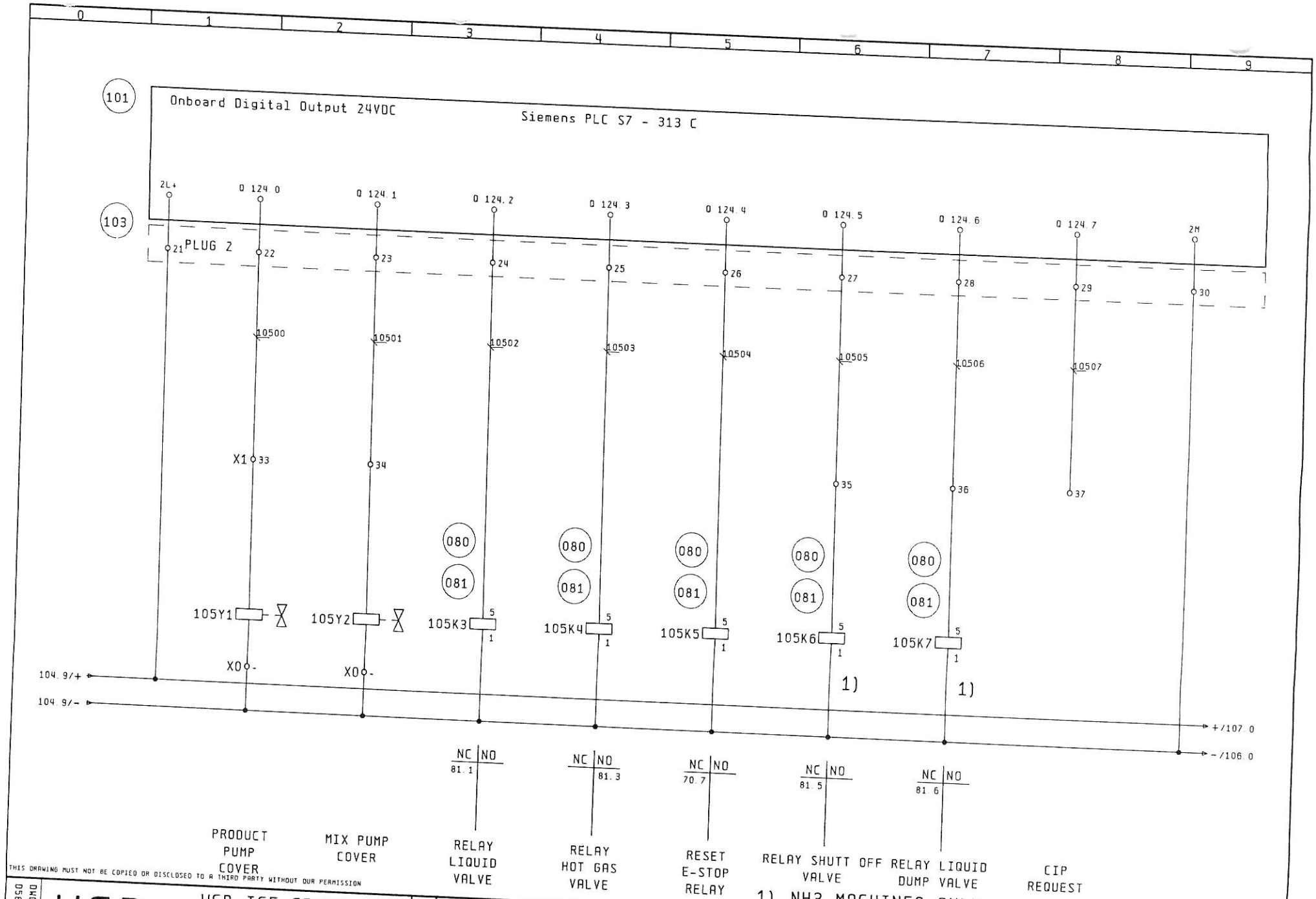

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WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N. DENMARK

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DIGITAL OUTPUTS Q 124.0 - Q 124.7

Customer

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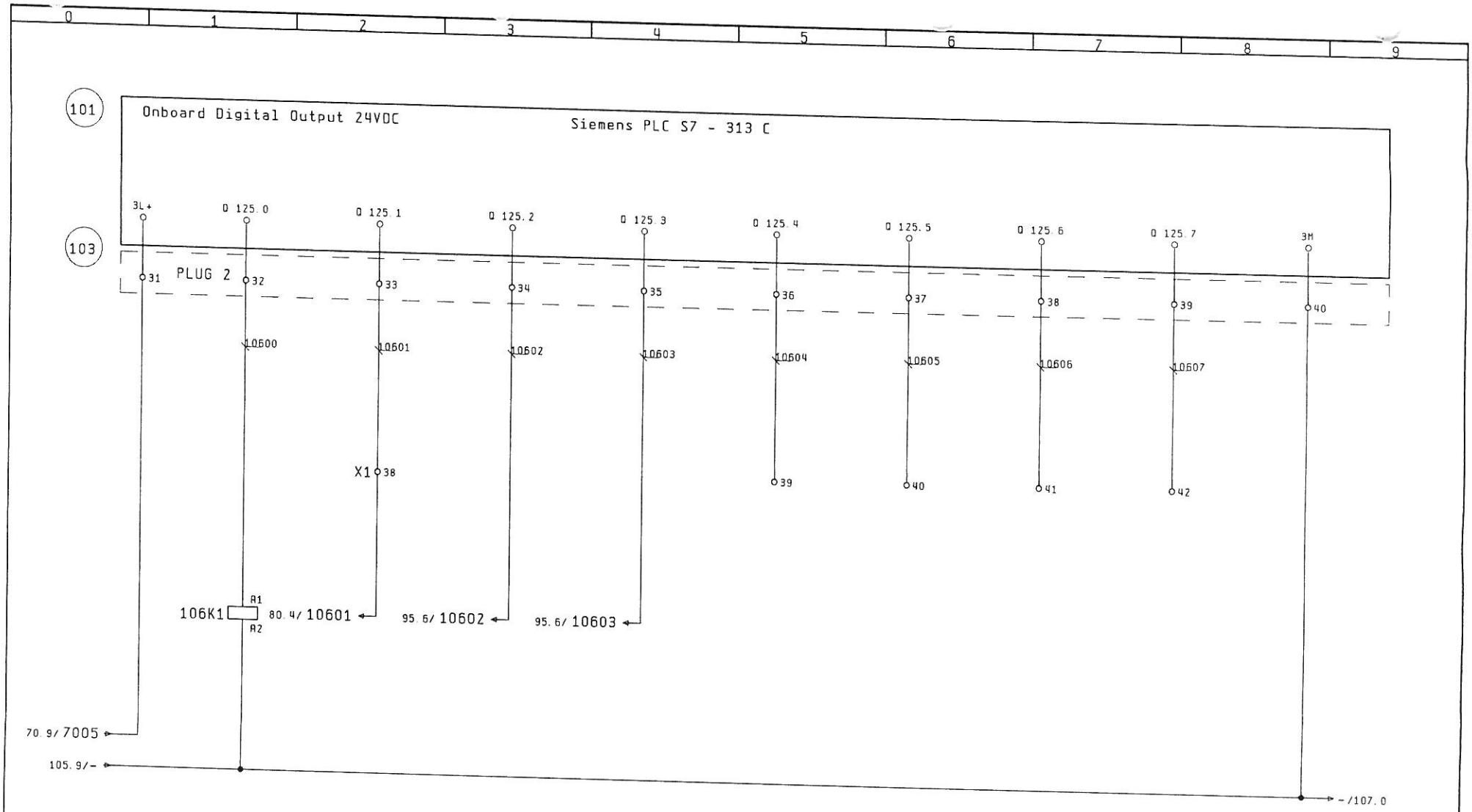

NC	NO
10.1	84.2
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84.2	85.2
85.2	84.2
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85.2	

COMPRESSOR CONTACTOR NOT NH3 MACHINES	DASHER START SIGNAL	MIX PUMP START SIGNAL	PRODUCT PUMP START SIGNAL	AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE

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GRAHAM BELLS VEJ 6
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DIGITAL OUTPUTS Q 125.0 - Q 125.7

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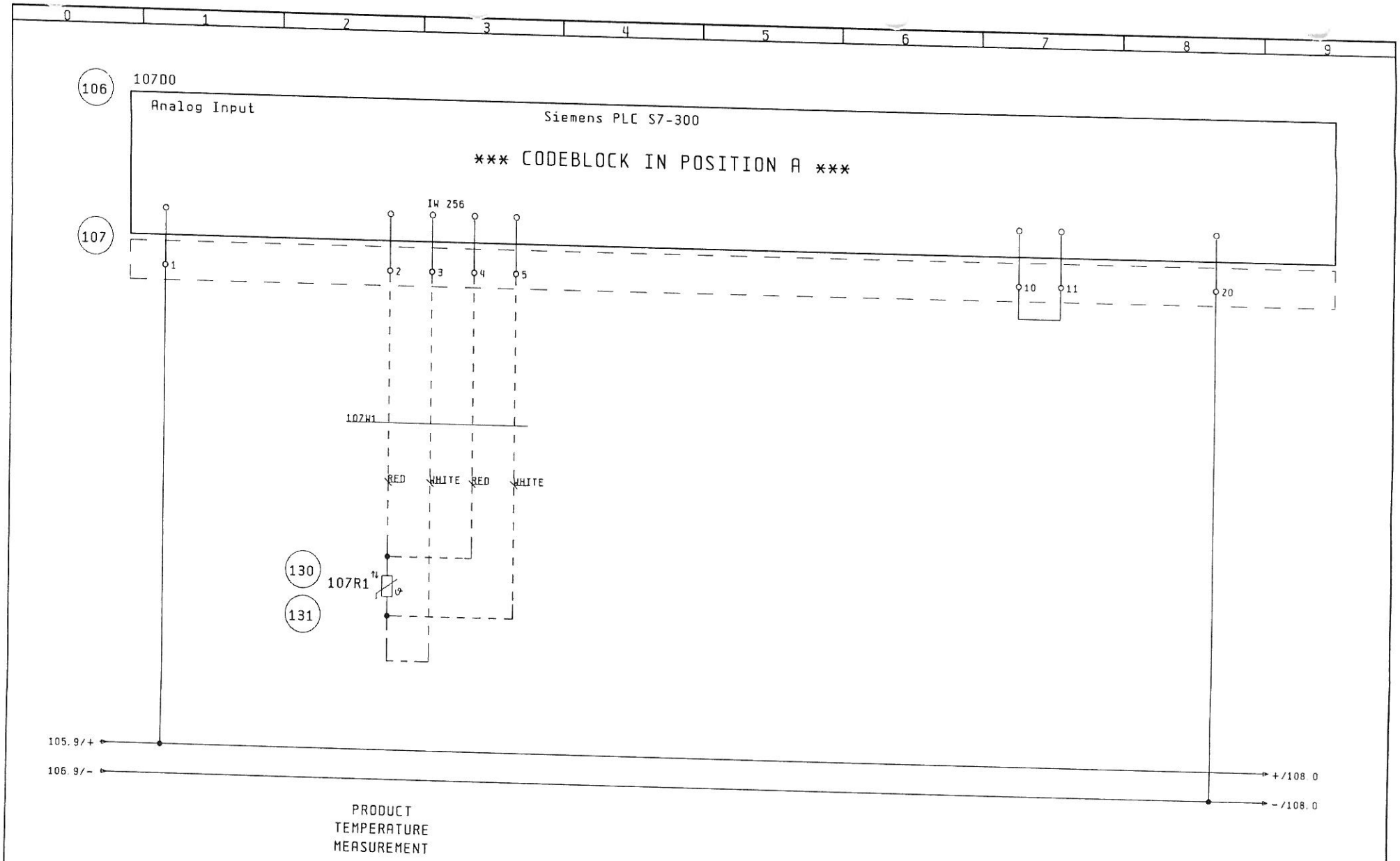

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WCB

WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N. DENMARK

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ANALOG INPUT IW 256
PRODUCT TEMPERATURE

Customer

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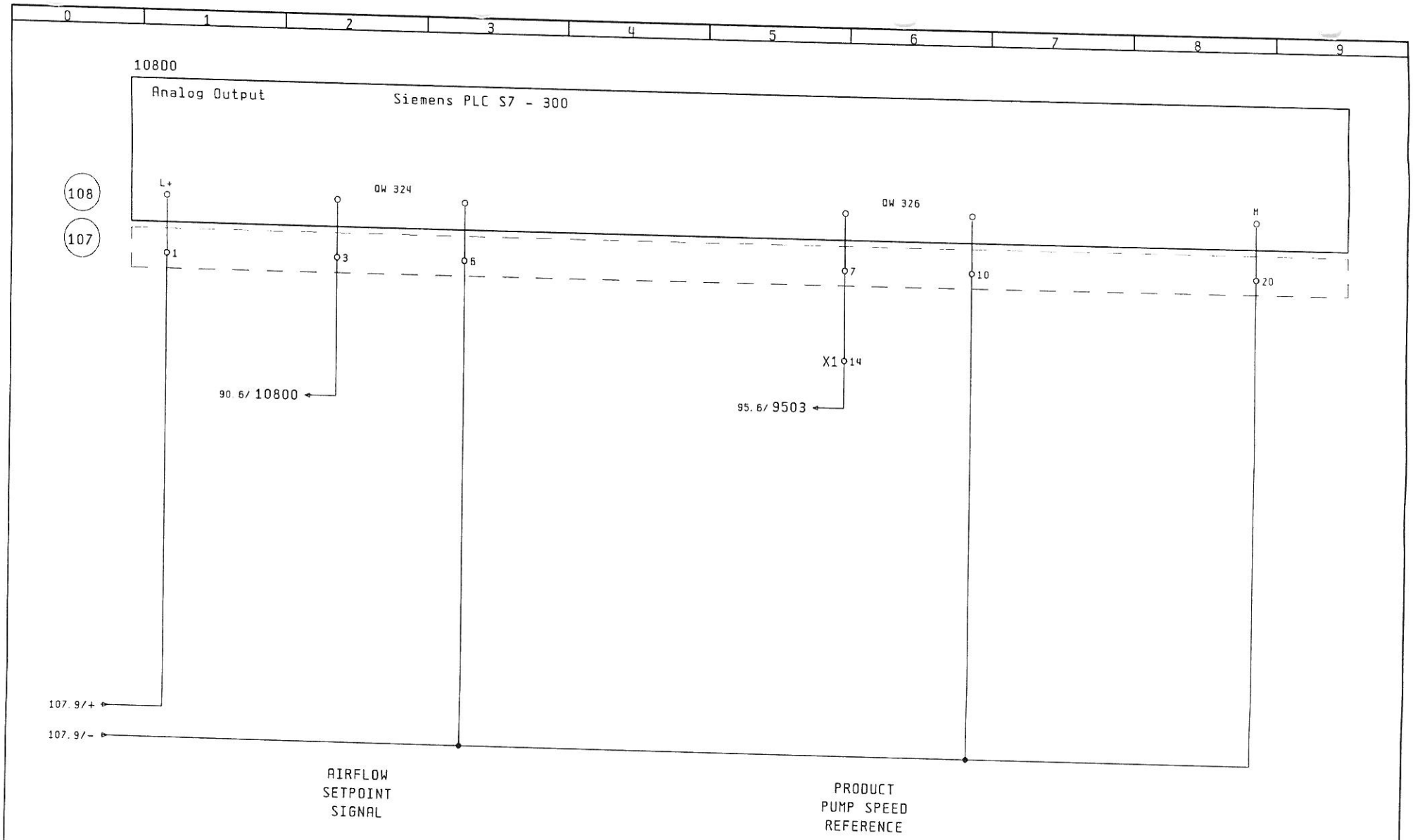

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WCB ICE CREAM
GRAHAM BELLS VEJ 6
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ANALOG OUTPUTS QW 324 - QW 326

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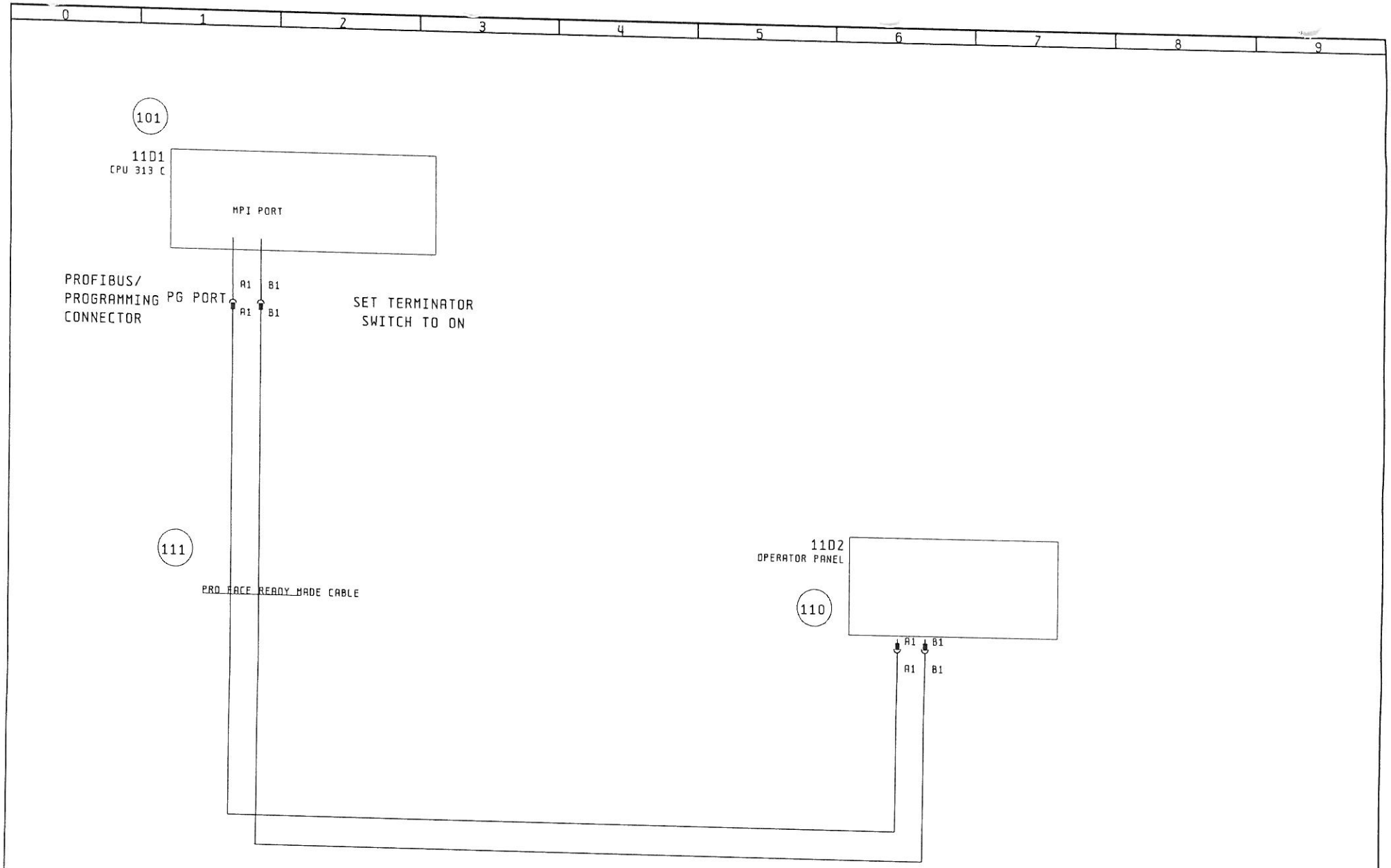

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WCB

WCB ICE CREAM
GRAHAM BELLS VEJ 6
DK-8200 AARHUS N. DENMARK

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SERIAL COMMUNICATIONS
SIEMENS <> OPERATOR PANEL

Customer

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Table of contents

User interface Program Loading

Connect a laptop to the Pro-face panel using the USB serial cable.

Open the Pro-face application software.

Select the MF-program.

Go to the project menu and select "Transfer".

In the Transfer menu, select "Send".

The operator panel program is now downloaded to the panel.

Unit set up when unit is new or any time software is installed

The following parameters need to be entered when the unit is new or any time software is installed in the in the programmable controller.

1. Enter the following parameters.

- General Parameters.
- CIP Parameters.
- High and Low Mix Flow Rate Parameters.

High and Low Motor Load Parameters.

Table of contents

Operating manual MF Freezer GA

Manual preface

Thank you for choosing the MF GA freezer/Upgrade Kit

This manual describes the functions of the freezer's control system.

The manual is divided into 3 sections: The operator level, the super user level and the master level.

Each section is independent from each other and has few references to the other sections. Therefore it is possible for instance to copy only the operator level section and distribute it to your operators. In that way they will have a simple operation manual without having to read through the all the complicated sections dealing with maintenance parameter settings.

Furthermore each paragraph in the sections is made as "stand alone", so tiresome paging through several paragraphs are avoided.

We hope that this manual will be useful to you. If you have corrections or suggestions on how to improve the manual, please contact the Technical Documentation Department at WCB Ice Cream.

Telephone:	+45 87 41 20 00
Fax:	+45 87 41 20 01
Email:	WCBICE@wcbicecream.dk

Operating manual MF Freezer GA

Passwords and operating levels

The operation of the freezer is divided into 3 levels separated by passwords. The passwords will be handed over in a separate envelope. Before running the unit you must consider who should be entitled to enter the higher levels of operation and distribute the passwords accordingly.

Section 1 - Operator level

The first level is the operator level where it is possible to operate the machine, change recipes and check Alarms.

Adjustment of product and machine settings is not available.

Section 2 - Super User level

The second level is the super-user level. The facilities are the same as mentioned under the operator level, but additionally it is possible to adjust product settings, make recipes, and adjust various machine settings.

The super-user password will disable itself after 5 minutes.

Section 3 - Master level

The third level is the master level. The facilities are the same as mentioned under the super-user level, but, additionally it is possible to reset scheduled maintenance alerts, test the control system, and make a refrigerant pump down.

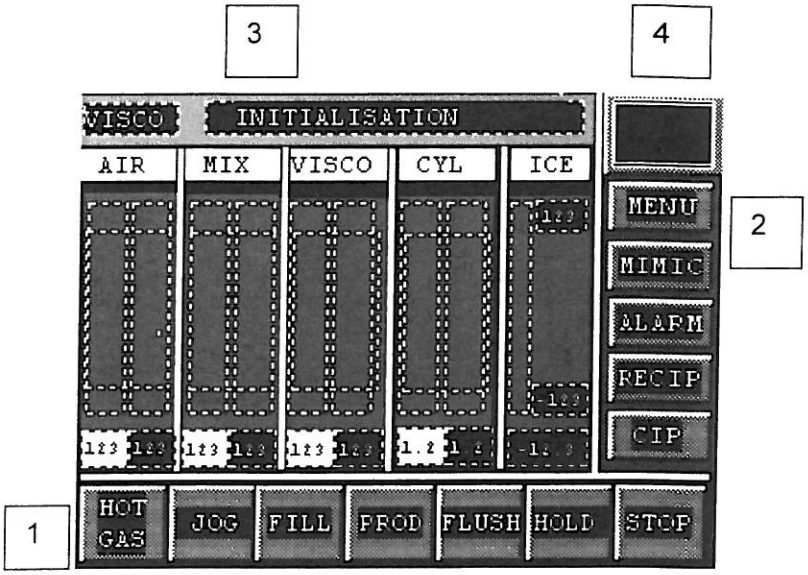
The master password will not disable itself and must be disabled by keying an invalid password.

Section 1 – Operator Level

Production

Production on viscosity

The production screens are the normal main screens of the MF freezer. On these screens it is possible to operate the freezer and gain access to alarms and recipe selection just by pressing one button. There are 2 production screens:
One for running the freezer on viscosity (motor load on dasher) and one for running the freezer on ice cream temperature. Changeover from one production screen to another is done automatically when refrigeration control method is selected in the product menu.



This screen is the normal production screen when the freezer is set-up for viscosity production. The screen is divided into the status indication part, the controller area, the main command panel and the operator navigation panel.

Controller Area

Overrun controller:

This controller is maintaining the requested amount of air dosed into the ice mix. The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. The white numbers on a black background is the measured value. The value is in percent just as the set point. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the overrun set-up screen, where it is possible to adjust parameters of the overrun controller. Please note that either the super user - or the master password has to be enabled in order to enter into the set-up screen.

Mix flow rate controller

This controller is maintaining the requested mix flow through the freezer. The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. White numbers on a black background is the measured value. The value is in litres per hour, just as the set point. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the mix flow set-up screen, where it is possible to adjust parameters of the mix flow controller.

Please note that either the super user password or the master password has to be enabled in order to enter into the set up screen.

Viscosity Controller

This controller is maintaining the requested stiffness of the product by measuring the load of the dasher motor and comparing it to the set point. A high motor load means a stiff (cold) product, while a low motor load means a soft (warm) product. The actual product temperature can be read on the cream temperature indicator.
The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point.. The white numbers on a black background is the measured value. The value is in motor load in %, just as the set point. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the viscosity controller set-up screen where it is possible to adjust parameters of the controller. Please note that either the super user or the master password has to be enabled in order to enter into the set-up screen.

Cylinder pressure controller:

This controller is maintaining the requested cylinder pressure inside the freezer barrel by comparing the measured pressure to the set point. The speed of the product pump will be adjusted according to the difference between the two values. The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. The white numbers on a black background is the measured cylinder pressure in bar. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the cylinder pressure controller set up screen, where it is possible to adjust parameters of the controller. Please note that either the super user or the master password has to be enabled in order to enter into the set up screen.

Product temperature indicator:

This indicator is showing the current ice cream temperature. The white numbers on a black background is the measured temperature in Celsius

1. Main command panel

The main command panel is separated from the controller area by a blue line. Inside this blue line the selected recipe name is displayed. The main command panel is where the various daily functions of the freezer are started and stopped. Seen from left to right the functions are:

Hot gas:
Pressing this button will initiate the defrosting sequence. The hot gas valve will open and the freezer will defrost until the defrost timer expires. The hot gas button will light up in red and the status indicator will write "**defrost**" for as long as the sequence is running.

Jog:
A push on this button will make the dasher run for about four seconds. When the dasher is running the button will light up in green.

Fill:
By pressing this button you will initiate the filling sequence. There are 2 ways of filling, depending on freezer set-up.
One method of filling is to lead mix into the freezing cylinder until the general cut in pressure set point is reached.
The other method is to measure the mix flowing into the freezing cylinder by means of a mix flow meter. Filling will then be complete when the mix flow filling level set point is reached.
For as long as the filling mode is enabled the status indicator till say "**Filling**". When filling pressure, or mix flow level has been reached the status indicator will change to "**Filled**" thus indicating that the freezer is ready for production. If the max filling time expires before the filling set point is reached, filling will be aborted and the status indicator will say "**Idle**" instead of "**Filled**".
Filling can be stopped manually by pressing the red stop button.

Freeze:
Pressing this button will start the freezing cycle if the filling has been completed successfully. If not the filling sequence will be started first. A filling success will then initiate freezing automatically.
Freezing can be stopped manually by pressing the red stop button. As long as the freezer is freezing the status indicator will say "**Freezing**". 6 seconds after the dasher is started, the motor load is stored. When the motor load reaches the initial motor load plus threshold, the freezer will go into production. The status indicator changing from "**Freezing**" to "**Production**" will indicate change over from freezing to production.
Freezing or production can be stopped manually by pressing the red stop button:**Flush.**
When the freezer is in idle mode, pressing this button will turn on the optional booster pump and open the pump CIP by-pass covers thus allowing for a rapid flushing of the freezer.
If the freezer is in production pressing the flush button first time will turn off the refrigeration. This initial flush uses the pumps on the freezer to push the stiff product through the discharge lines.
When the product becomes fluid enough for the booster pump to pump it through the discharge lines the flush button can be pressed a second time. This will turn off the pumps on the freezer and open the CIP by-pass covers. The dasher will continue to run. This secondary flush, pumps a much greater volume of rinse water through the freezer and will flush out the product much faster.
Pressing flush a third time will return the freezer into filling mode and then to production. Great care must be taken to ensure that no water is present inside the freezer when this happens.

Hold:
When the hold key is pressed the freezer will be placed in hold mode. If the freezer was in freeze mode when the hold key was pressed, the freezer may be placed in the freeze mode again without going through filling again if the dasher was not stopped.
If dasher has stopped rotating, the unit will go through the fill mode before going into freeze mode again.
If the freezer is in fill mode when the hold key is pressed, the filling process will be paused until the operator presses the hold key again to resume the filling process.
If the unit is in CIP mode when the hold key is pressed the CIP mode will be suspended.

Stop:
Pressing this button will initiate a shutdown of the freezer if it is in the freeze -, fill -, production -, sanitize - or CIP mode.

2. Operator navigation panel

This panel is used for calling up various useful features of the Operator panel.

Menu:
This button is used for jumping to the main menu screen.

Mimic:
Pressing this button will bring up a graphical representation of the functions of the freezer.

Alarm:
Pressing this button will bring up the alarm screen, where a specific alarm can be checked.

Recipe:
Pressing this button will bring up the recipe screen, where it is possible to select, change, save and activate a recipe.

CIP:
Pressing this button will bring up the CIP screen, where it is possible to activate cleaning and sanitizing of the machine.

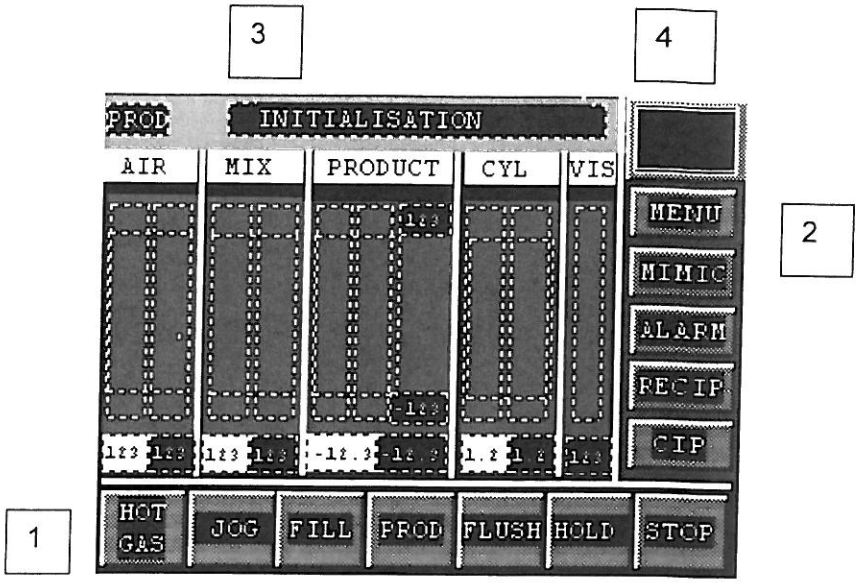
3. Status indicator

This area is always reporting the actual status of the freezer in plain text.

4. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

Production on ice cream temperature



This screen is the normal production screen when the freezer is set-up for production on ice cream temperature.
The screen is divided into the status indication part, the controller area, the main command panel and the operator navigation panel.

Controller Area

Overrun controller:

This controller is maintaining the requested amount of air dosed into the ice mix. The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. The white numbers on a black background is the measured value. The value is in percent just as the set point. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the overrun set-up screen, where it is possible to adjust parameters of the overrun controller. Please note that either the super user - or the master password has to be enabled in order to enter into the set-up screen.

Mix flow rate controller

This controller is maintaining the requested mix flow through the freezer. The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. White numbers on a black background is the measured value. The value is in litres per hour, just as the set point. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the mix flow set-up screen, where it is possible to adjust parameters of the mix flow controller.

Please note that either the super user password or the master password has to be enabled in order to enter into the set up screen.

Ice Cream Temperature Controller:

This controller is maintaining the requested stiffness of the product by measuring the product temperature at the freezer barrel outlet and comparing it to the set point.

The backpressure control valve will act on the difference. If there is a difference the valve will open up if the actual temperature is bigger than set point and close if the actual temperature is smaller than the set point.

The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. The yellow numbers on a black background is the measured value. The value is in Celsius.

The bar graphs show the set point (white bar graph) and the measured value (grey bar graph).

If you press the bar graph area you will enter into the Ice Cream Controller set-up screen where it is possible to adjust parameters of the controller. Please note that either the super user or the master password has to be enabled in order to enter into the set-up screen.

Cylinder pressure controller:

This controller is maintaining the requested cylinder pressure inside the freezer barrel by comparing the measured pressure to the set point. The speed of the product pump will be adjusted according to the difference between the two values. The white field with black numbers is the set point. Touching this white area will bring up the data entry screen where it is possible to change the set point. The white numbers on a black background is the measured cylinder pressure in bar. The bar graphs are showing the set point (white bar graph) and the measured value (grey bar graph). If you press the bar graph area you will enter into the cylinder pressure controller set up screen, where it is possible to adjust parameters of the controller. Please note that either the super user or the master password has to be enabled in order to enter into the set up screen.

Motor Load Indicator:

This indicator is showing the current load on the dasher motor.
The white numbers on a black background is the measured motor load in percent.

1. Main Command Panel

The main command panel is separated from the controller area by a blue line. Inside this blue line the selected recipe name is displayed. The main command panel is where the various daily functions of the freezer are started and stopped. Taken from left to right the functions are:

Hot Gas:
Pressing this button will initiate the defrosting sequence. The hot gas valve will open and the freezer will defrost until the defrost timer expires. The hot gas button will light up in red and the status indicator will write "defrost" for as long as the sequence is running.

Jog:
A push on this button will make the dasher run for about four seconds. When the dasher is running the button will light up in green.

Fill:
By pressing this button you will initiate the filling sequence. There are 2 ways of filling, depending on freezer set up. One method of filling is to let mix into the freezing cylinder until the general cut in pressure set point is reached. The other method is to measure the mix flowing into the freezing cylinder by means of a mix flow meter. Filling will then be complete when the mix flow filling level set point is reached.
For as long as the filling mode is enabled the status indicator till say "**Filling**". When filling pressure, or mix flow level has been reached the status indicator will change to "Filled" thus indicating that the freezer is ready for production.
If the max filling time expires before the filling set point is reached, filling will be aborted and the status indicator will say "**Idle**" instead of "**Filled**".
Filling can be stopped manually by pressing the red stop button.

Freeze:
Pressing this button will start the freezing cycle if the filling has been completed successfully. If not the filling sequence will be started first. A filling success will then initiate freezing automatically.
Freezing can be stopped manually by pressing the red stop button. As long as the freezer is freezing the status indicator will say "**Freezing**". 6 seconds after the dasher is started, the motor load is stored. When the motor load reaches the initial motor load plus threshold the freezer will go into production.
The status indicator changing from "**Freezing**" to "**Production**" will indicate changeover from freezing to production.
Freezing or production can be stopped manually by pressing the red stop button.

Flush:
When the freezer is in idle mode, pressing this button will turn on the optional booster pump and open the pump CIP by-pass covers thus allowing for a rapid flushing of the freezer.
If the freezer is in production pressing the flush button first time will turn off the refrigeration. This initial flush uses the pumps on the freezer to push the stiff product through the discharge lines.
When the product becomes fluid enough for the booster pump to pump it through the discharge lines the flush button can be pressed a second time. This will turn off the pumps on the freezer and open the CIP by-pass covers. The dasher will continue to run. This secondary flush, pumps a much greater volume of rinse water through the freezer and will flush out the product much faster. Pressing flush a third time will return the freezer to the fill mode and then to production. Great care must be taken to ensure that no water is present inside the freezer when this happens.

Hold:
When the hold key is pressed the freezer will be placed in hold mode. If the freezer was in freeze mode when the hold key was pressed, the freezer may be placed in the freeze mode again without going through filling again if the dasher was not stopped.
If dasher has stopped rotating, the unit will go through the fill mode before going to freeze mode again.
If the freezer is in filling mode when the hold key is pressed, the filling process will be paused until the operator presses the hold key again to resume the filling process.
If the unit is in CIP mode when the hold key is pressed the CIP mode will be suspended.

Stop:
Pressing this button will initiate a shutdown of the freezer if its in the freeze, fill, production, sanitize or CIP mode.

2. Operator navigation panel

This panel is used for calling up various useful features of the Operator panel.

Menu:
This button is used for jumping to the main menu screen.

Mimic:
Pressing this button will bring up a graphical representation of the functions of the freezer.

Alarm:
Pressing this button will bring up the alarm screen, where a specific alarm can be checked.

Recipe:
Pressing this button will bring up the recipe screen, where it is possible to select, change, save and activate a recipe.

CIP:
Pressing this button will bring up the CIP screen, where it is possible to activate cleaning and sanitizing of the machine.

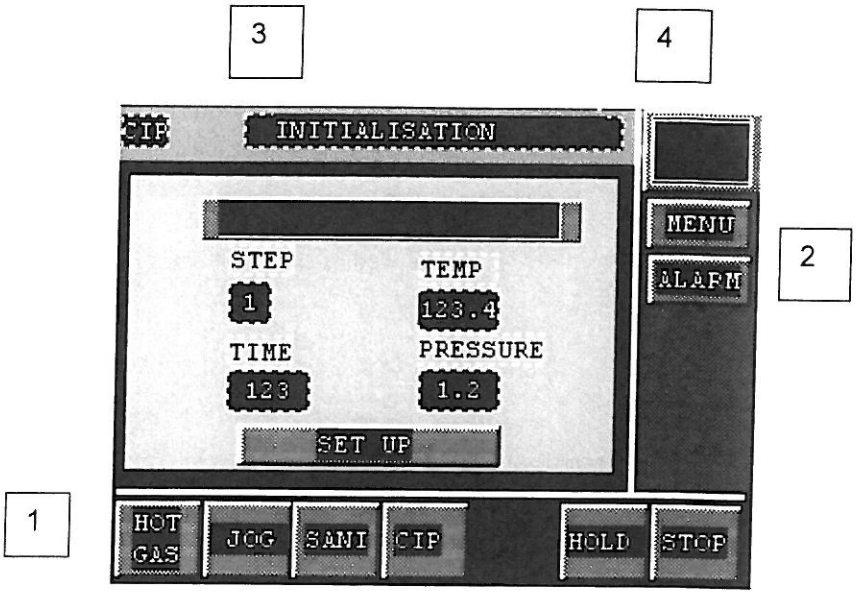
3. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

4. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

Cleaning and sanitizing



On the cleaning screen it is possible to start/stop and supervise the cleaning and sanitizing sequences.

Cleaning status

In the middle of the screen the cleaning/sanitizing status area is placed. It consists of the following items:

Cleaning Status Message Area:

The status message area tells in plain text if certain conditions have halted the cleaning. If the message area is blank when cleaning/sanitizing is on, conditions are ok and the sequences are running as scheduled.
The message area can show the following messages:

Low Pressure:
The cut-in barrel pressure defined in the General Set up Screen has not been reached and the Cleaning/sanitizing sequence is halted.

Unacknowledged:
The external digital input signal coming from a CIP plant is not on and the cleaning/sanitizing sequence is halted. If this facility is not used the digital input must be hardwired to +24V. This is done as default from the factory.

Step:

Indicates which step the cleaning/sanitizing cycle is currently in.

There are three steps:
1: General flushing time with pumps and dasher on
2: Pumps and dasher are running

Time:

Shows the remaining time of the current cleaning/sanitizing step. If time count down is halted, conditions for running the cleaning/sanitizing sequence has failed. The cause of halting can be read on the Cleaning Status Message Area.

Temperature:
Indicates the temperature at the mix inlet or product outlet depending on MF model.

Cylinder Pressure:
Indicates the current pressure inside the barrel.

Set-up:
By pressing this button the cleaning/sanitizing screen will appear on the screen if either the super user or the master password has been enabled. On the set-up screen it is possible to adjust the parameters of the cleaning/sanitizing cycles.

1. Main Command Panel

The main command panel is separated from the controller area by a blue line. Inside this blue line the selected recipe name is displayed. The main command panel is where the various daily functions of the freezer are started and stopped. Taken from left to right the functions are:

Hot Gas:

Pressing this button will initiate the defrosting sequence. The hot gas valve will open and the freezer will defrost until the defrost timer expires. The hot gas button will light up in red and the status indicator will write defrost for as long as the sequence is running.

Jog:
A push on this button will make the dasher run for about four seconds. When the dasher is running the button will light up in green.

Sani:
A push on this button will activate the sanitizing sequence.

CIP:
A push on this button will activate the cleaning sequence.

Hold:
When the hold key is pressed the cleaning and sanitizing sequences will be halted. A second press on the button will start cleaning/sanitizing again.

Stop:
Pressing this button will stop the cleaning/sanitizing sequence and bring up the production screen on the Display.

2. Operator Navigation Panel

This panel is used for calling up various useful features of the Operator Panel.

Menu:
This button is used for returning to the production screen. Please note that a running cleaning/sanitizing sequence will block this button.

Alarm:
Pressing this button will bring up the alarm screen, where a specific alarm can be checked.

3. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

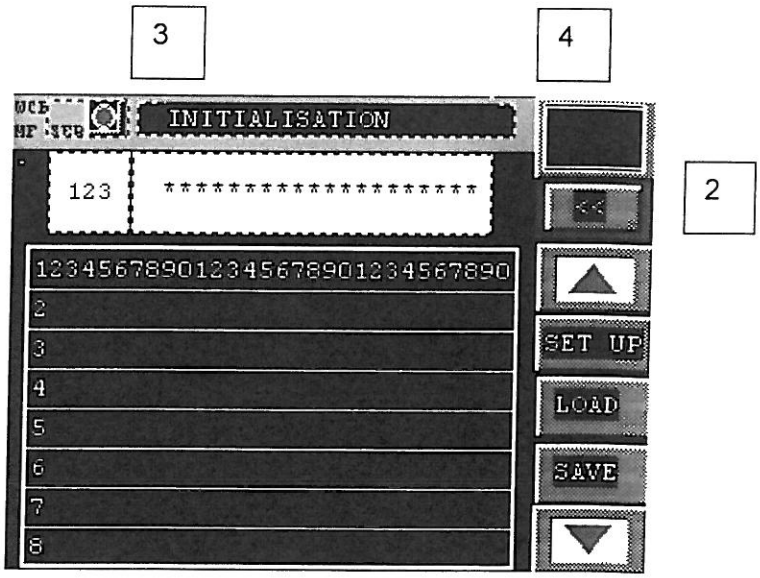
4. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

Handling recipes

The MF freezer can hold up to 150 recipes. The data are stored in the operator interface memory. When a recipe is activated, the data are transferred from the operator panel to the PLC where they are used for adjusting the control system to the product.

On the left hand window the product names are listed. You can scroll through the listing using the arrow up and down buttons.
The current product name is listed in the white area it is possible to change the name by touching the white area. This will bring up the data entry screen.



A typical way to create a recipe is first to make the freezer produce with the mix and with the selected set points. When the freezer is running stable and the product quality is good type the recipe name into the current recipe area. Then use the scroll buttons either to select an empty recipe (empty recipes are indicated by the character P and the recipe number), or an unused recipe. When the recipe location is selected press <**Save** > and all product settings are stored. Since the amount of data is considerable saving can last up to a couple of seconds.
By pressing the button <**Load**> the recipe selected in the left hand window will be transferred to The PLC. This transfer can take up to a couple of seconds too.
By pressing the button <**Set up**> the product set up screen will pop up on the screen if the super user or master password is enabled. In the product set up screen refrigeration control method can be selected and parameters having influence on how the freezer is responding to the ice mix can be set.

2. Operator Navigation Panel

This panel is used for calling up various useful features of the Operator Panel.

<<: This button is used for returning to the production screen.

3. Status Indicator

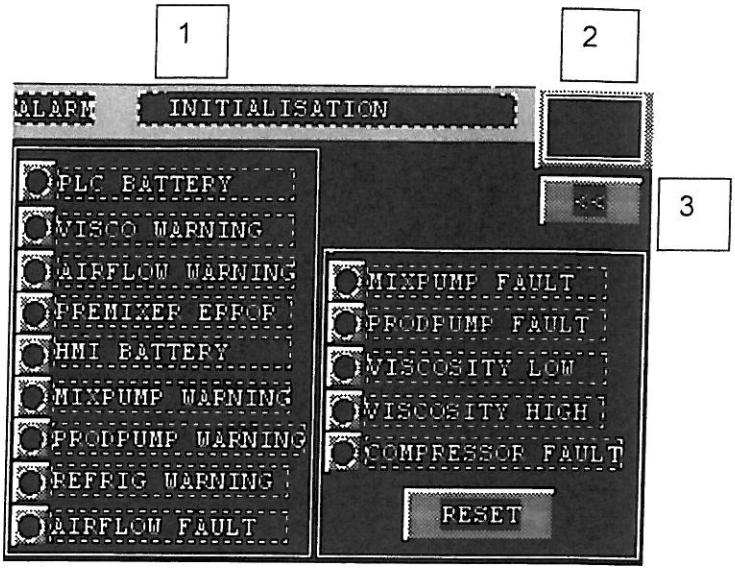
This area is always reporting the actual status of the freezer in plain text.

4. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

The alarm screen

The alarm conditions are listed on this page. If on or more alarms are active the grey lamp to the left of the alarm condition will change state to red. The alarms are divided into alarms and warnings (left side) and defrost alarms (right side).



Alarms and Warnings

PLC Battery:
When the back up battery in the PLC goes low the square indicator is highlighted. Change the battery to a new as quickly as possible to avoid loss of program and data. If the main power is cut when the battery is low, program and data in the PLC will be lost.
Some PLC do not have a battery back up. Program and data are stored in a flash memory instead and thus protected from power cuts.

Visco Warning:
When the current consumption of the dasher motor reaches the motor load warning limit, the Indicator is highlighted. At the same time the opening of the refrigeration Control valve is reduced to keep the unit from freezing up. When the current consumption goes below the warning limit minus dead band the alarm disappears and the refrigeration control valve resumes normal operation.

Air Flow Warning:
When the difference between the overrun set point and the measured values exceeds the Airflow deviation set point, the indicator is highlighted.
When the difference drops below the deviation set point the alarm is cancelled.

Premixing Fault:
When the healthy signal from the optional pre-mixer inverter and circuit breaker is missing the indicator is highlighted. When the signal is restored the alarm disappears.

HMI Battery:
When the battery in the HMI goes low in capacity the grey indicator is highlighted. The alarm disappears again when a new battery is installed. Not all operator panels require a battery.

Mix Pump Warning:
If the mix pump is running at min or max speed the indicator is highlighted. When speed increases or decreases the alarm is cancelled. This alarm is only active during production.

Product Warning:
If the product pump is running at min or max speed the indicator is highlighted. When speed increases or decreases the alarm is cancelled. The alarm is only active during production.

Refrig Warning:
If the refrigeration valve is fully opened the indicator is highlighted, when opening is reduced the alarm is cancelled. The alarm is only active during production.

Air Flow Fault:
If the airflow meter is fully opened the indicator is highlighted and an alarm is given.
When the opening drops below max, the alarm is cancelled. The alarm is only active during Production.

Defrost Alarms

Mix Pump Fault:
If the ok signal from the mix pump inverter is missing and the unit is in production the indicator is highlighted and a defrost sequence is started.
The alarm must be cancelled by pressing the reset button in the lower part of the defrost alarm area.

Product Pump Fault:
If the ok signal from the product pump inverter is missing and the unit is in production the indicator is highlighted and a defrost sequence is started.
The alarm must cancelled by pressing the reset button in the lower part of the defrost alarm area.

Viscosity Low:
If the dasher motor load drops below the minimum setting and the unit is in production the Indicator is highlighted and a defrost sequence started.
The alarm must cancelled by pressing the reset button in the lower part of the defrost alarm area.

Viscosity High:
If the dasher motor load exceeds the motor load high limit during production the Indicator turns is highlighted and a defrost sequence started.
The alarm must cancelled by pressing the reset button in the lower part of the defrost alarm area.

Compressor Fault:
If the control system of the freezer detects on of the following errors, the freezer wil stop and defrost.
The errors are:

1. High pressure in Compressor. If the cooling water supply to the machine fails, the pressure in the compressor will rise. When a too high pressure is detected by the high pressure transducer, the defrost will start

2. Low pressure in Compressor. If the oil pressure in the compressor drops below safe limit.

3. Compressor overheated. If the compressor motor is overheating.

1.Status Indicator

This area is always reporting the actual status of the freezer in plain text.

2. Alarm Indicator

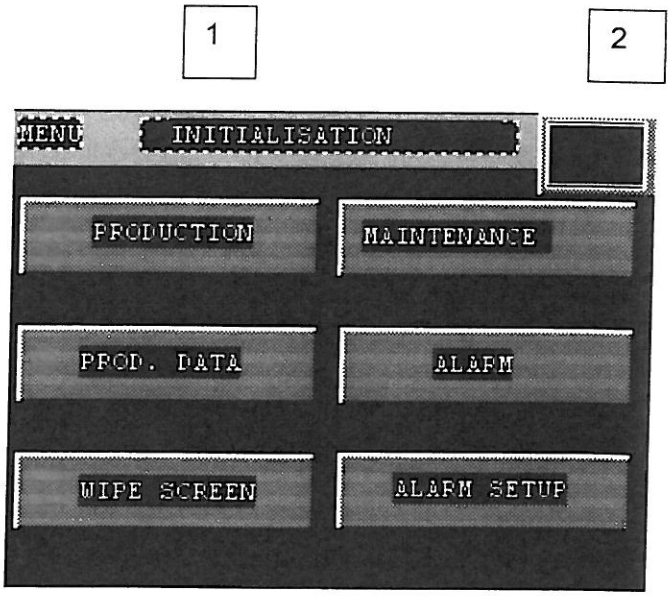
When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

3. Operator Navigation Panel

<< This button is used for returning to the previous screen.

The main menu

On the main menu screen it is possible to jump to production, set ups and alarm screen. The more delicate maintenance and set up screens are protected by password.



Production:
Pressing this button will bring the production screen on the display

Production Data:
Pressing this button will bring up the production data screen on the display. On this screen it is possible to check consumed mix, quantity of product, average overrun and production time.

Wipe Screen:
Pressing this button will bring up the Wipe Screen. This is used for cleaning the screen area. The Screen is best cleaned with a soft moisturized cloth.

Maintenance:
Pressing this button will bring up the maintenance main menu on the display.

Alarms:
Pressing this button will bring the alarm status screen on the display.

Alarm Set up:
Pressing this button will bring the alarm set up screen on the display if the super user or master password is enabled.

1. Status Indicator

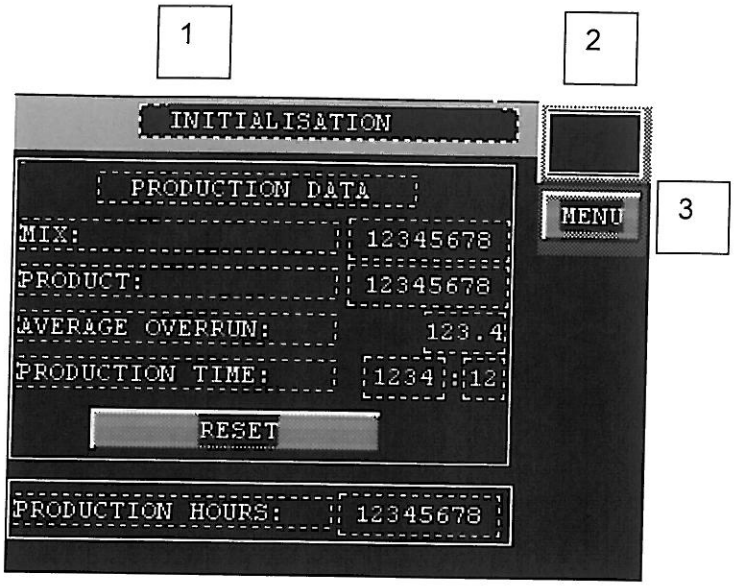
This area is always reporting the actual status of the freezer in plain text.

2. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

Production data

On this screen various useful data from the production can be seen.



Mix:
This number shows the accumulated amount of used mix since the value was last reset.

Product:
This number shows the accumulated amount of product made by the unit since the value was last reset.

Average Overrun:
This number shows the accumulated average of overrun in the product since the value was last reset.

Production Time:
Shows how long time the unit has been in production since last reset.

<Reset>:
By pressing this button the data mentioned above will be zeroed. Normally this is done before production starts.

Production Hours:
This is the total production time of the unit. This value cannot be reset.

1. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

2. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

3. Operator Navigation Panel

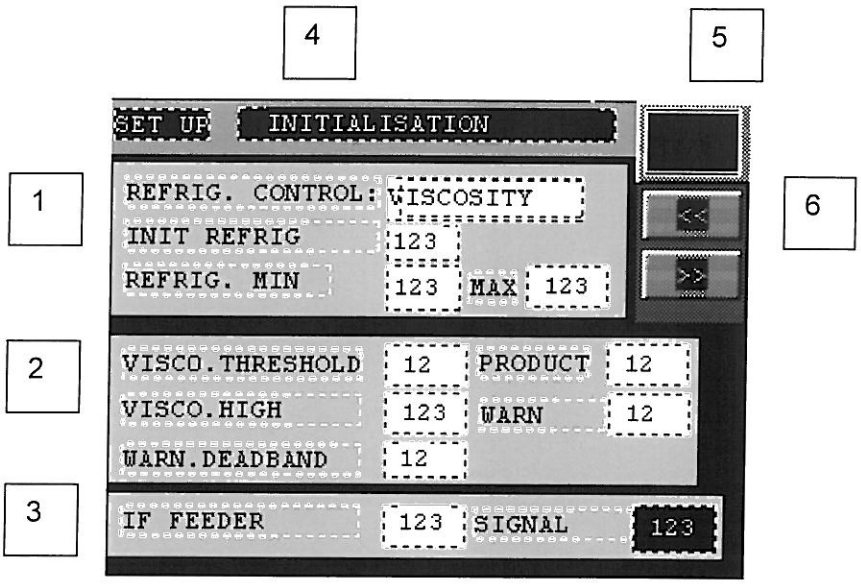
Menu This button is used for returning to the previous screen.

Section 2 – Super User Level

This section describes the possibilities available for the super user. Please note that access to the functions described here requires enabling of the super user password.

Setting Product related Parameters

By pressing the Set-up button on the Product recipes Screen you enter into the Product Set-up screen.



1. Refrigeration Control Parameters

These parameters have influence on how the refrigeration system is controlled.

Refrigeration Control:
By pressing the white area you can choose between producing on viscosity product temperature or evaporator pressure control.

Init Refrig %:
This parameter sets the opening of the refrigeration control valve when the freezer is in freezing mode (starting up after filling). The value should be set just high enough to produce a suction pressure of 1 bar (15Psig) when the refrigerant used is ammonia.

Refrig Min:
This parameter sets the minimum allovable opening of the back pressure valve. On Halocarbon machines with built in compressor the back pressure valve must not close fully and therefore this parameter is usually set to 10%. On NH3 machines the parameter can be set to 0%.

Max:

This parameter controls how much the viscosity or temperature controller can open the refrigeration valve during production. By reducing this value when running product at a very low capacity controller overshooting Can be limited and thus preventing the freezer from freezing up.

2. Thresholds:

Threshold is the point at which the mix pump, cream pump and overrun control loops are enabled, that is when the freezer goes from freezing to production. Depending on production mode, the control system will use either the motor load threshold (when running on viscosity) or product temperature threshold (when running on ice cream temperature)

ViscoThreshold:
Approximately 6 seconds after the Dasher motor is started, the motor load value from the current transducer is stored in the control system. When the motor load exceeds this value plus the motor load threshold the freezer will enter into production mode.

Product:
When the measured product temperature is lower than the start-up temperature minus the threshold, the freezer will enter into production mode.
Motor load limits are settings used for limiting the risk of freezing up.

Visco High:
This value is the point at which a defrost sequence will be initiated and production terminated.

Warn:
When the motor load exceeds this value the following will occur:

1. Refrigeration will be turned off.
2. The last back pressure valve setting will be reduced by 5% for when the control loop is enabled again.

Motor Load Warning Deadband:
This value determines how much the motor load warning limit the motor load must drop before the control loop is restored.

3. IF Feeder Set-up:

IF Feeder set-up is used to control a downstream WCB Ingredient Feeder.

IF Feeder Control:
This value is used for adjusting the analog speed reference signal to the Ingredient Feeder.

IF Feeder Signal:
This value shows the current speed reference signal to the Ingredient Feeder. The value is proportional to the mix flow rate.

4. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

5. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

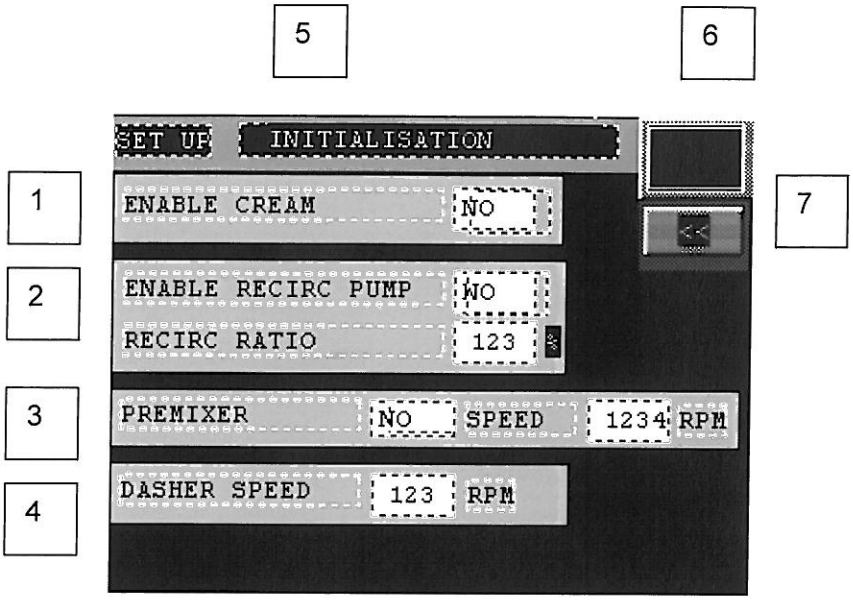
6. Operator Navigation Panel

<< This button is used for returning to the previous screen.

>> This button is used to go to the Cream function setup screen

Setting Cream Function related Parameters

If the freezer has the Cream functions installed the functions can be controlled from this screen.



1.Enable Cream:

This button is used to activate the Cream functions. It is only possible to toggle this switch if the freezer is equipped with the Cream option.

2. Re-circulation Set-up:

Pre-mixer settings are used to control the re-circulation pump:

Enable Recirc. Pump:
This button is used to enable or disable the recirculation pump.. This is a toggle function so one press on the white will make area change from no to yes. Next press on the area will change the state from yes to no.

Recirc. Ratio:
This value is used to control the amount of recirculated product. The value is in percent of the actual capacity of the cream pump.

3. Pre-mixer Set-up:

Pre-mixer settings are used to control the pre-mixer:

Pre-mixer no:
This button is used to enable or disable the pre-mixer. This is a toggle function so one press on the white will make area change from no to yes. Next press on the area will change the state from yes to no.

Pre-mixer Speed:
This value is used to control the speed of the optional pre-mixer. The value is rpm´s.

4. Variable Dasher Speed:

This parameter is used for controlling the speed of the dasher. The value is in rpm´s.

5. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

6. Alarm Indicator

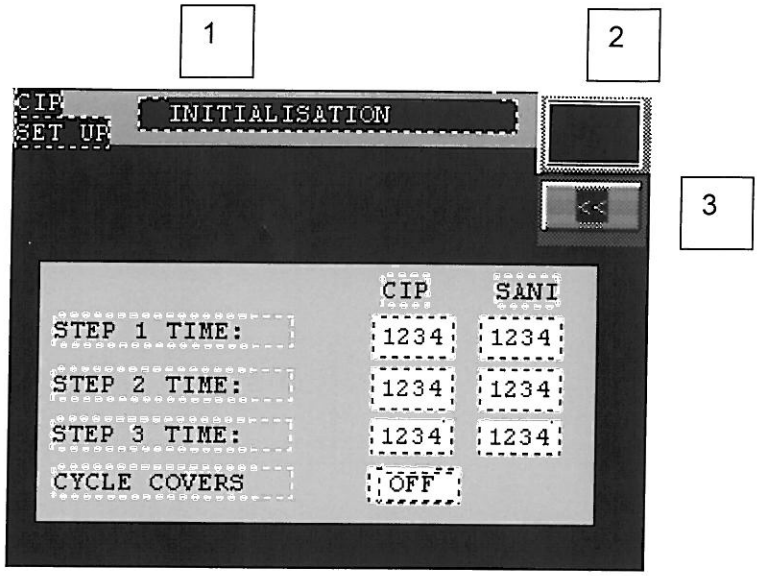
When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

7. Operator Navigation Panel

<< This button is used for returning to first set up screen.

Setting CIP and Sanitize Parameters

The CIP and sanitize set-up screen allows you to tailor suit the freezers CIP and sanitize sequences to your specific needs.



Step 1:
You adjust the time set point for CIP step 1 with this parameter. Step 1 is where the pumps and the dasher are idle, the pump covers are open, and the CIP liquid is flushing through the machine. Touch the blue area to set the time.

Step 2:
This is the time set point for CIP step 2. In this step the pumps and dasher is running. Touch the blue area to set the time.

Step 3:
This is the time set point for CIP step 3. In this step the pump covers are cycled for a better cleaning of the pumps. Touch the blue area to set the time.

Cycle Pump Covers:

By pressing this button you can select or deselect if the cycle covers function (step 3) should be in. Touch the on/off area to select or deselect.

In the area on the right of the screen you adjust the parameters related to the Sanitize sequence.
The step functions are the same as described under the CIP steps. The sanitize sequence is meant to be a short sequence for letting sterilizer through the freezer just before start of production.

1. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

2. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

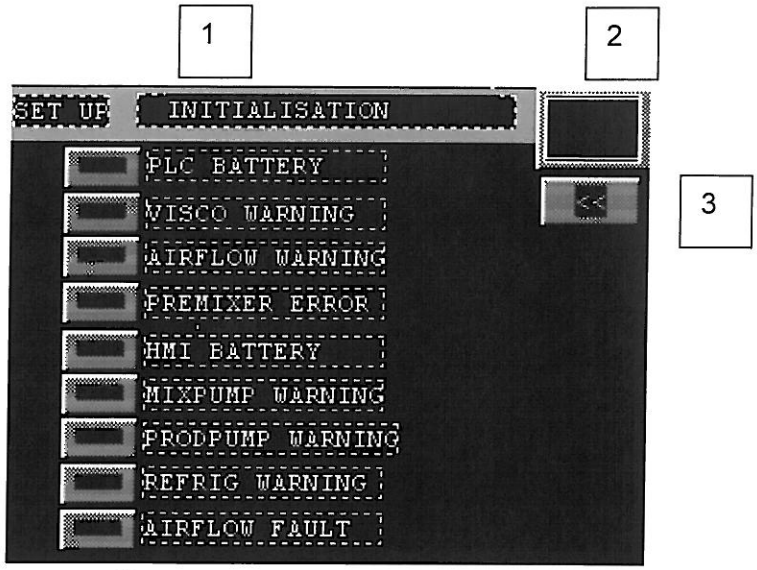
3. Operator Navigation Panel

<< This button is used for returning to previous screen.

Alarm Set-up

The alarm set-up screen allows you to enable or disable the alarms in alarm group 1 and 2. The defrost alarms cannot be disabled. See the Alarm Screen Section in this manual for a further description of the alarms.

By toggling the button the corresponding alarms will be enabled or disabled.
A white button indicates that the alarm is enabled. A grey button indicates that the alarm is disabled.



1. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

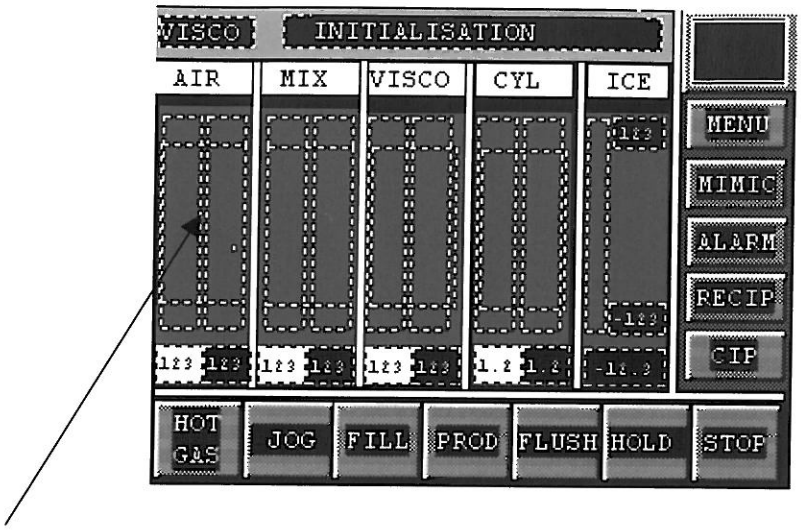
2. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

3. Operator Navigation Panel

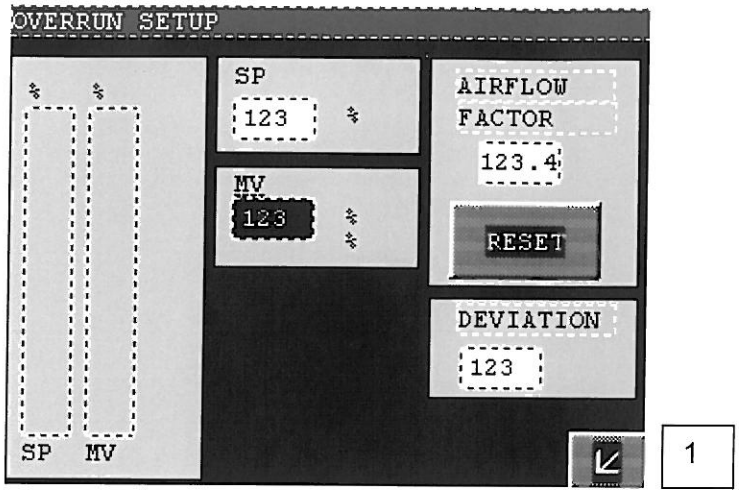
<< This button is used for returning to previous screen.

Adjusting Overrun Control Parameters



By pressing the middle of the bar graph area on the overrun controller on production screen, indicated as a rectangle on the picture above, you will enter into the overrun set-up screen where it is possible to adjust overrun parameters.

Overrun Set-up



The bar graph area on the left of the screen shows the overrun set point (SP) and the current overrun measured Value (MV) in percent. Please note that even if the set point is white it is not possible to change it.

Air Flow Factor:

This parameter makes it possible to adjust the overrun so it will correspond to the control measurements you make.
To adjust note the difference between the measured overrun value on the screen and the control measurements.
Adjust the airflow factor with the difference. Make a couple of control measurements after about 5 minutes to check:

1. If the overrun is correct.

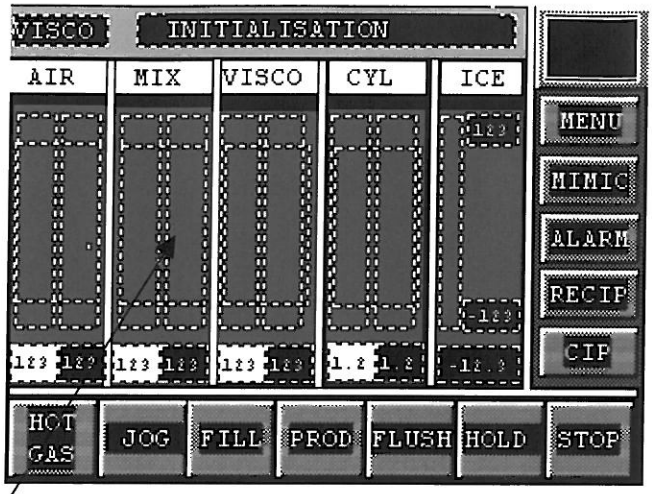
2. If you press the reset button the airflow factor will be reset to its factory preset value.

Air Flow Deviation:

This parameter controls the alarm message for airflow deviation. The value is in percent. If you for instance
Adjust the parameter to 20. The airflow deviation alarm will appear when the difference between the overrun set point and the overrun process value exceeds 20 %.

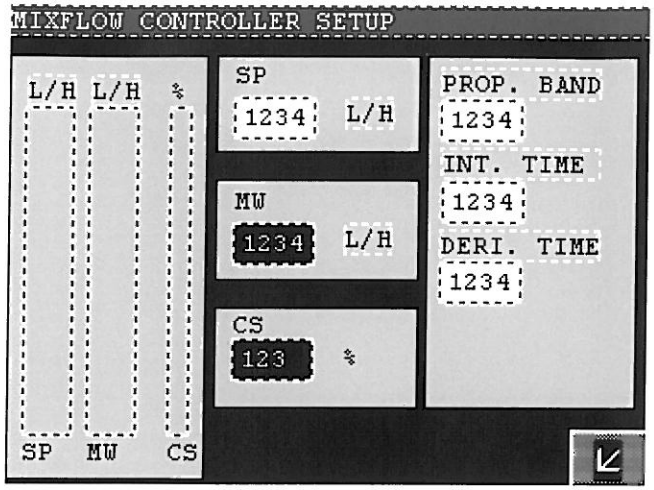
1. Press this button to return to the Production Screen

Adjusting Mix flow-rate Control loop Parameters



By pressing the middle of the bar graph area on the mix flow controller, indicated as a rectangle on the picture above, you will enter into the mix flow set-up screen where it is possible to adjust the various parameters related to the mix flow control loop.

Mix Flow rate Tuning



On the bar graph area on the left of the screen the set point, the current measured mix flow value and the control output to the mix pump inverter are represented.

In the middle area of the screen the same values are shown but here in engineering units. It is possible to change the white set point value by touching the white area and key in the set point you want.

Prop. Band

This parameter relates to the PID control loop of the mix flow. This value is factory set to give a smooth and stable Mix flow by speeding up or slowing down the mix pump according to the difference between set point and measured value. If you are experiencing fluctuations in the mix flow it might be necessary to adjust this parameter. If you decrease the value the control loop becomes more responsive but if you lower it too much the control loop might oscillate. If the value is too big the control loop response might be too slow.

Int. Time

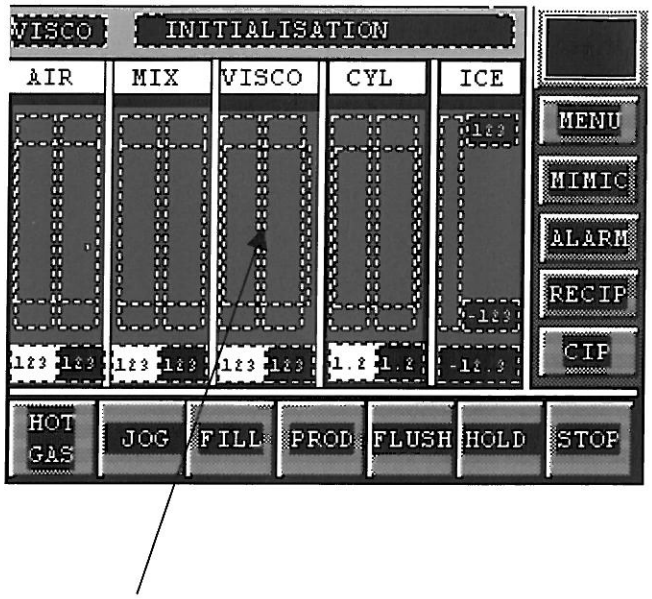
This parameter relates to the PID control loop of the mix flow. This value is factory set to give a smooth and stable mix flow. If you are experiencing fluctuations in the mix flow it might be necessary to adjust this parameter. The Integration time is used to smooth out the influence of the response of the Proportional Band. The bigger the value the bigger influence on the controller response.

Deri. Time

This parameter relates to the PID control loop of the mix flow. If you are experiencing fluctuations in the mix flow it might be necessary to adjust this parameter. The derivative time is used by the controller to minimize the difference between set point and measured value. On some controllers this value is set to 0 and therefore not used. Great care must be taken when adjusting this value.

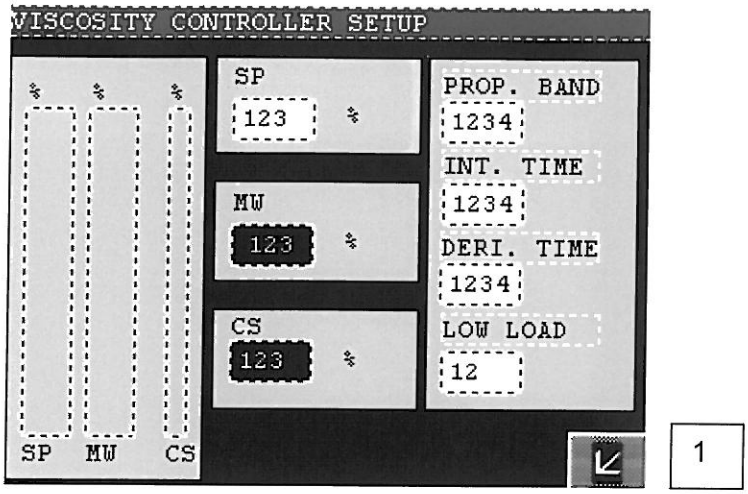
1. Press this button to return to the Production Screen

Adjusting Viscosity Control loop Parameters



By pressing the middle of the bar graph area on the viscosity controller, indicated as a rectangle on the picture above, you will enter into the motor load set-up screen where it is possible to adjust the various parameters related to the mix flow control loop.

Motor Load Tuning



On the bar graph area on the left of the screen the set point, the current measured motor load value and the control output to the backpressure valve is represented. Please note that all bar graphs are shown as percent of full-scale range of the freezer.
In the middle area of the screen the same values are shown but here in engineering units. It is possible to change the white set point value by touching the white area and key in the set point you want.

Prop. band

This parameter relates to the PID control loop of the viscosity. This value is factory set to give a smooth and stable control of the refrigeration and thus the viscosity of the produced ice cream by modulating the backpressure control valve according to the difference between set point and measured value. If you are experiencing fluctuations in the viscosity it might be necessary to adjust this parameter. If you decrease the value the control loop becomes more responsive but if you lower it too much the control loop might oscillate. If the value is too big the control loop response might be too slow.

Int. time

This parameter relates to the PID control loop of the mix flow. This value is factory set to give a smooth and stable control. If you are experiencing fluctuations in the viscosity it might be necessary to adjust this parameter. The Integration time is used to smooth out the influence of the response of the Proportional Band. The bigger the value the bigger influence on the controller response.

Deri. time

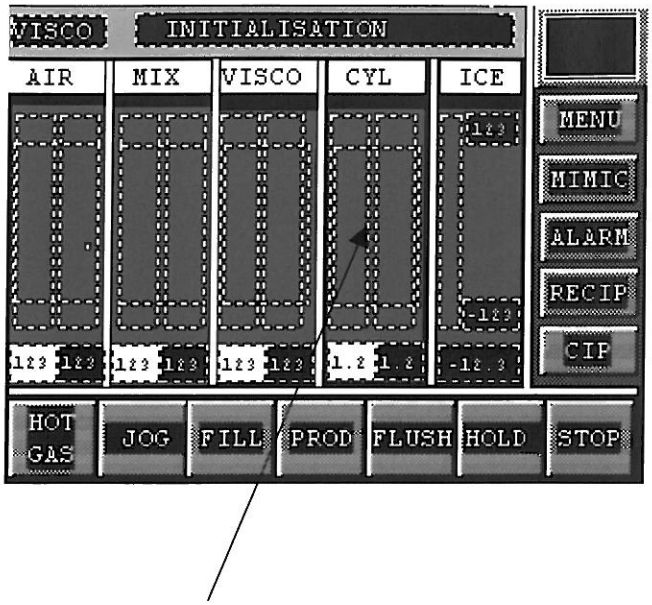
This parameter relates to the PID control loop of the viscosity control. If you are experiencing fluctuations in the viscosity control it might be necessary to adjust this parameter. The derivative time is used by the controller to minimize the difference between set point and measured value. On some controllers this value is set to 0 and therefore not used. Great care must be taken when adjusting this value.

Low load

This parameter is the lowest tolerable motor load before the control systems decides that there is a fault on the dasher power supply, initiates a defrost sequence and shuts down the freezer. Normally this parameter should be set to a value slightly below the current read in value when the dasher is running idle.

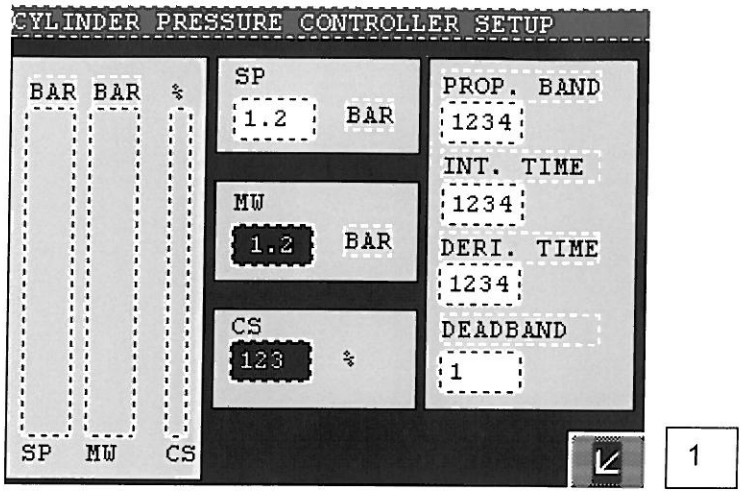
1. Press this button to return to the Production Screen

Adjusting Cylinder Pressure Control loop Parameters



By pressing the middle of the bar graph area on the cylinder pressure controller, indicated as a rectangle on the picture above, you will enter into the Cylinder pressure set-up screen where it is possible to adjust the various parameters related to the Cylinder Pressure control loop.

Cylinder Pressure Tuning



On the bar graph area on the left of the screen the set point, the current measured cylinder pressure and the control output to the product pump inverter is represented

In the middle area of the screen the same values are shown but here in engineering units. It is possible to change the white set point value by touching the white area and key in the set point you want.

Prop. band

This parameter relates to the "P" portion of the control loop of the cylinder pressure. This value is factory set to give a smooth and stable control of the flow of product through the freezer by speeding up or slowing down the product pump and thus keeping a constant pressure inside the freezing barrel. If you are experiencing fluctuations in the pressure it might be necessary to adjust this parameter. If you decrease the value the control loop becomes more responsive but if you lower it too much the control loop might oscillate. If the value is too big the control loop response might be too slow.

Int. time

This parameter relates to the "I" portion of the control loop of the cylinder pressure. This value is factory set to give a smooth and stable control. The Integration time is used to smooth out the influence of the response of the Proportional Band. The bigger the value the bigger influence on the controller response.

Deri. time

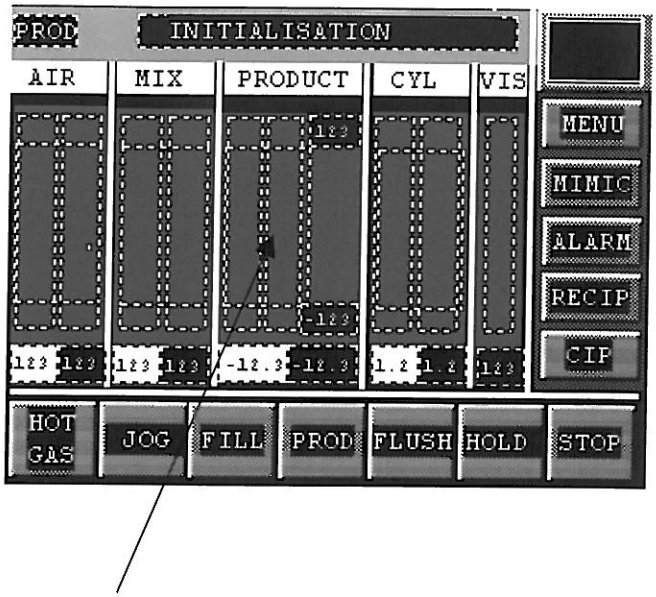
This parameter relates to the "D" portion of the control loop of the cylinder pressure control. The derivative time is used by the controller to minimize the difference between set point and measured value. On some controllers this value is set to 0 and therefore not used. Great care must be taken when adjusting this value.

Dead-band

This parameter is used to damp the response of the PID loop. The dead-band is the acceptable tolerance between set point and measured value before the control loop reacts.

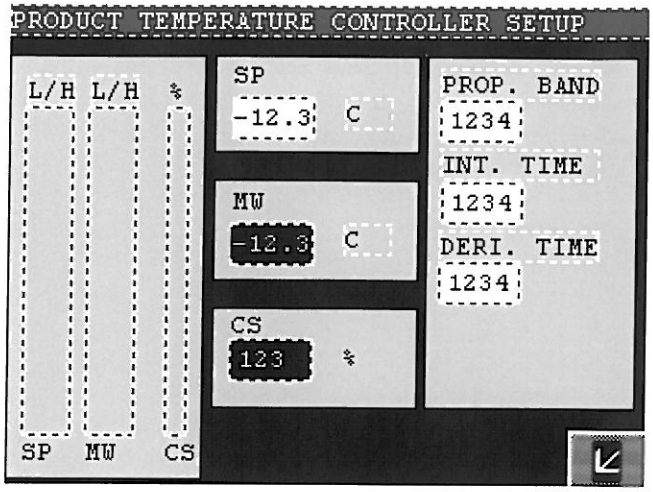
1. Press this button to return to the Production Screen

Adjusting Product Temperature Control loop Parameters



By pressing the middle of the bar graph area on the product temperature controller, indicated as a rectangle on the picture above, you will enter into the product temperature tuning screen where it is possible to adjust the various parameters related to the control loop.

Product Temperature Tuning



On the bar graph area on the left of the screen the set point, the current measured temperature and the control output to the backpressure control valve is represented. Please note that set point and measured value bar graphs are shown in engineering units while the control output bar graph is in percent of full scale.
In the middle area of the screen the same values are shown. It is possible to change the white set point value by touching the white area and key in the set point you want.

Prop. band

This parameter relates to the "P" portion of the control loop of the product temperature. This value is factory set to give a smooth and stable control of temperature of product by modulating the back pressure valve according to the difference between set point and measured value thus keeping a constant product temperature. If you are experiencing fluctuations in temperature it might be necessary to adjust this parameter. If you decrease the value the control loop becomes more responsive but if you lower it too much the control loop might oscillate. If the value is too big the control loop response might be too slow.

Int. time

This parameter relates to the "I" portion of the control loop of the product temperature. This value is factory set to give a smooth and stable control. The Integration time is used to smooth out the influence of the response of the Proportional Band. The bigger the value the bigger influence on the controller response.

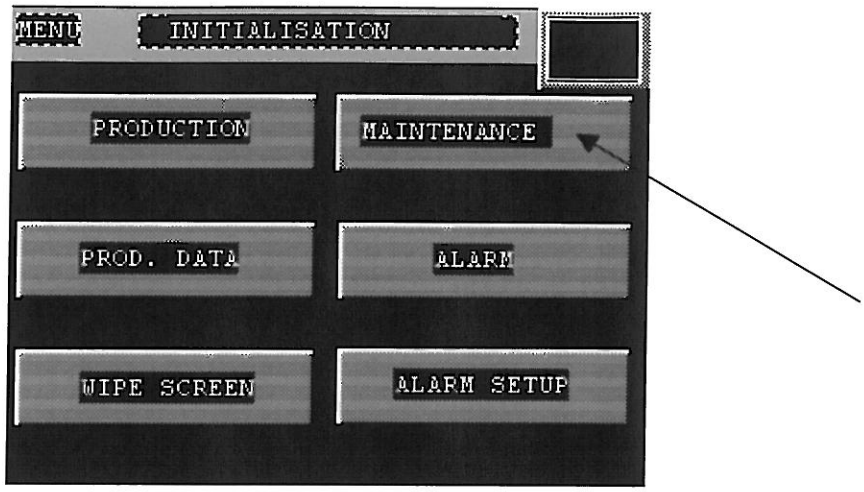
Deri. time

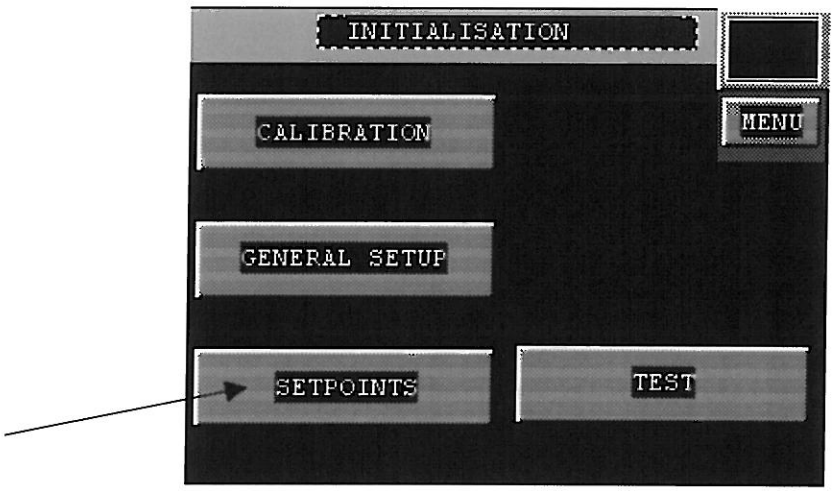
This parameter relates to the D portion of the control loop of the cylinder pressure control. The derivative time is used by the controller to minimize the difference between set point and measured value. On some controllers this value is set to 0 and therefore not used. Great care must be taken when adjusting this value.

1. Press this button to return to the Production Screen

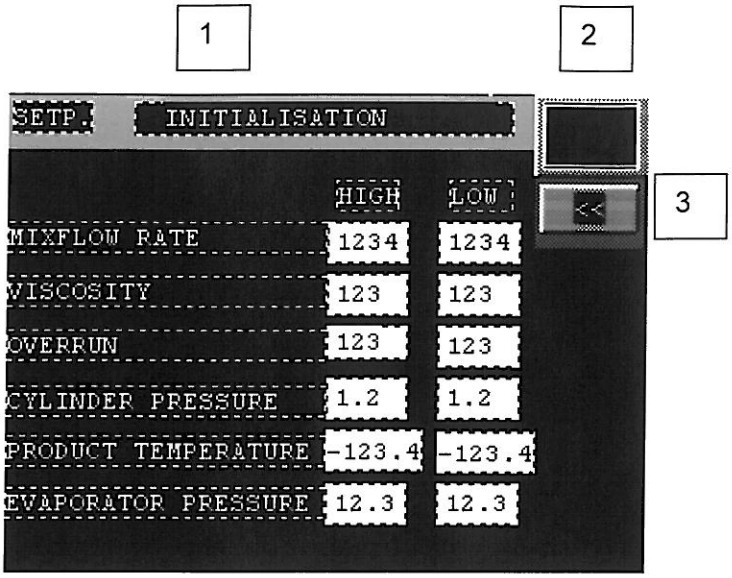
Limiting Operator adjustable set points

Sometimes it is desirable to be able to limit the operator adjustable set points. The set point High/Low Screen gives you the possibility. The 2 pictures below explain the route to this screen.





Set point High/Low



Mix flow rate high/low:

This pair of parameters makes it possible to limit the size of the mix flow rate set point.

Viscosity high/low:

This pair of parameters makes it possible to limit the viscosity set point and thereby reducing the risk of freezing up when producing on viscosity.

Overrun high/low:

This pair of parameters makes it possible to limit the overrun set point.

Cylinder pressure high/low:

This pair of parameters makes it possible to limit the cylinder pressure set point

Product temperature high/low:

This pair of parameters makes it possible to limit the product temperature set point and thereby reducing the risk of freezing up when producing on product temperature.

Evaporator pressure high/low (optional):

This pair of parameters makes it possible to limit the evaporator pressure set point

1. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

2. Alarm Indicator

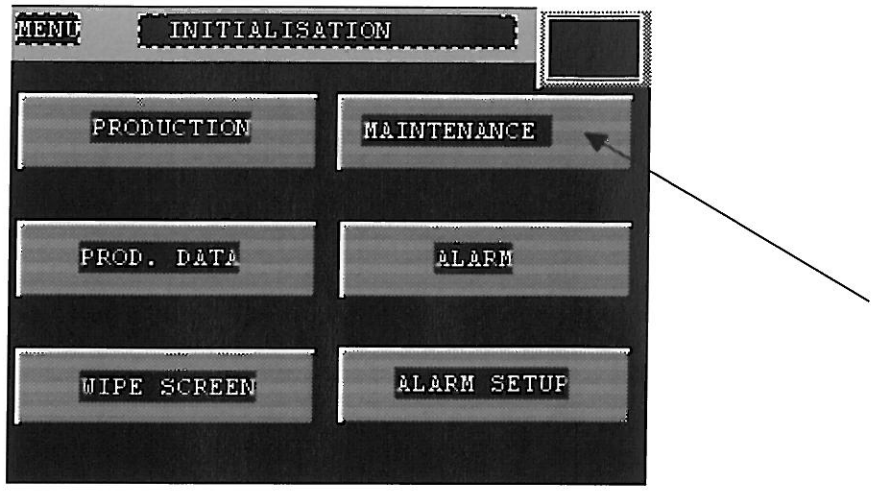
When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

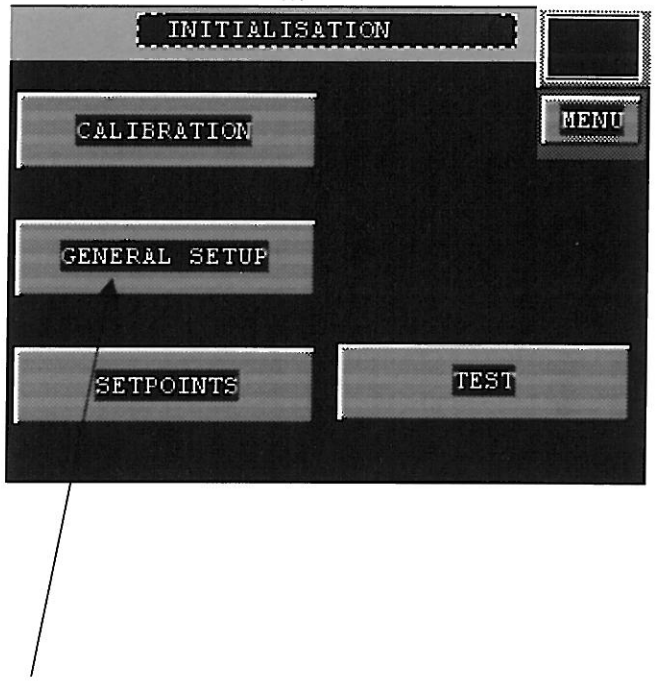
3. Operator Navigation Panel

Menu This button is used for returning to the maintenance main menu

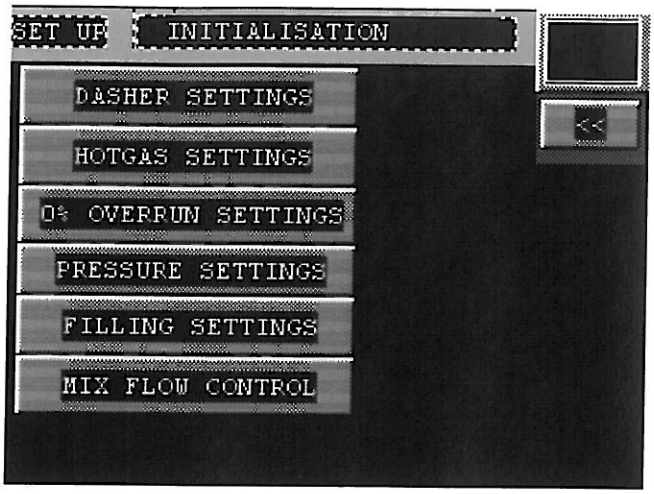
General set-up

In the general set-up screen all the machine specific, but not product specific parameters are located. On this screen it is possible to adapt the freezer to your specific needs. The 2 pictures below explain how to get to the general set-up screen.

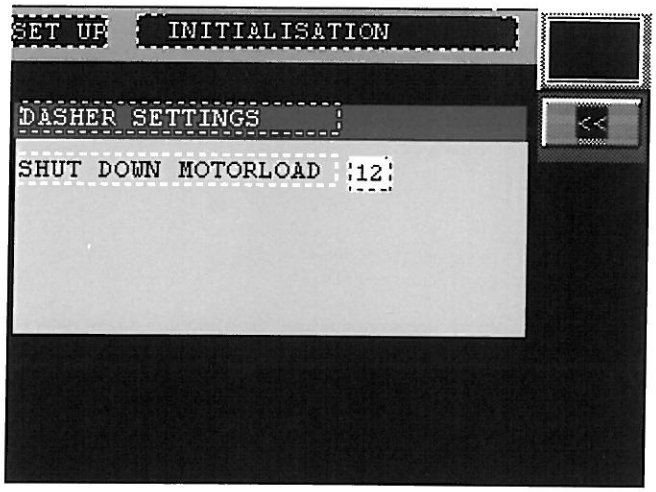




General Set-up

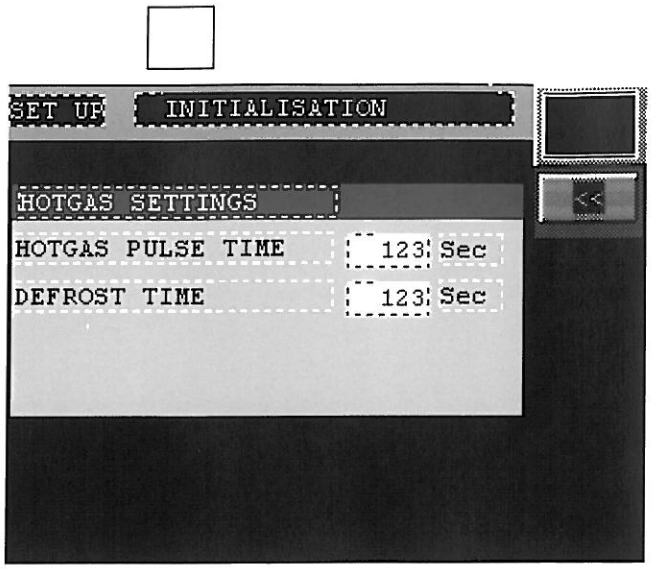


By pressing the various buttons on the general set up screen the adjustable parameters pops up on the screen.



Dasher Settings:

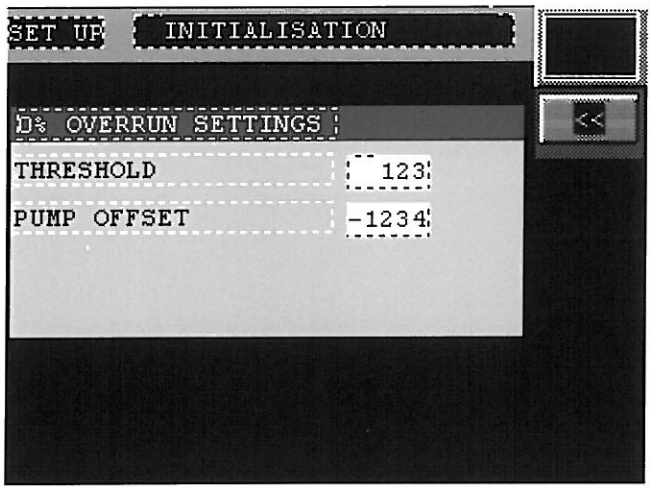
Production Shuts Down when Motor load less than:
When stopping the production the "Shutdown" will be active as long as the dasher motor load is bigger than this parameter. When the motor load goes below the parameter the "Shutdown" will terminate.



Hot Gas Settings:

Hot Gas Pulse Time:
This parameters sets the opening time of the hot gas valve during a hot gas sequence.

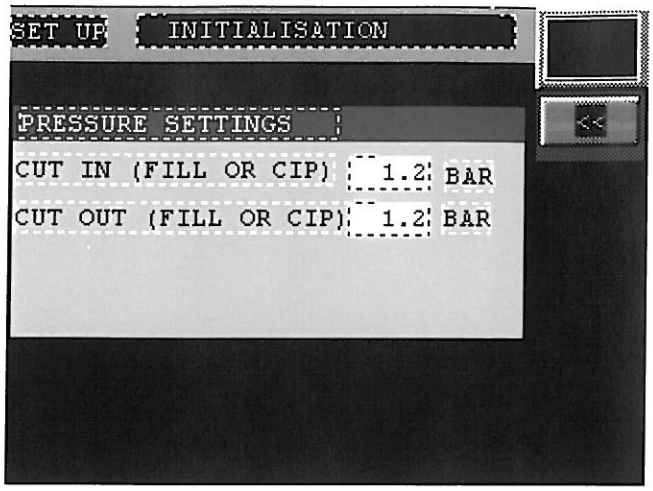
Defrost time:
This parameter controls the duration of the hot gas sequence.



0 % Overrun Settings:

Threshold:
This is the set point at which the freezer will operate in the fixed ratio mode. The mix and product pump set point will be the same. This is useful if the overrun is very low and cylinder pressure cannot be measured

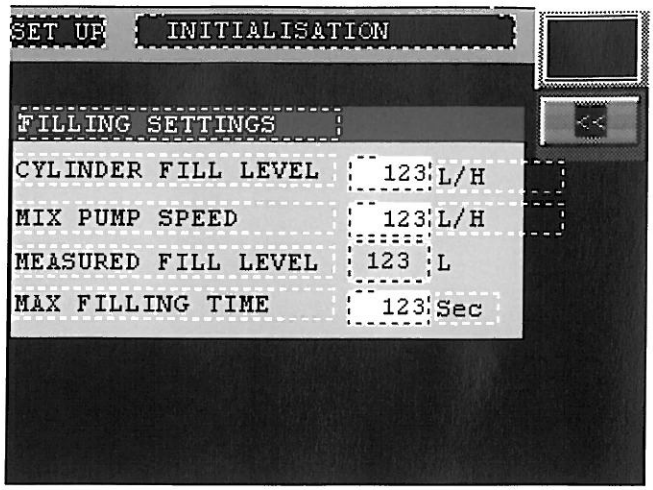
Pump Offset:
When the product is frozen in the cylinder, the expansion of the product will raise the cylinder pressure.
This parameter allows compensation for this increase in the cylinder pressure.
When the parameter is 0 the mix pump and product pump set points are equal.
To decrease the pressure in the cylinder this parameter must be positive.
To increase the pressure in the cylinder this parameter must be negative.



Pressure Settings:

Cut In When Filling Or In CIP/Sanitize:
When in filling mode this parameter is the point at which the freezers control system, based on cylinder pressure measurement, terminates the filling sequence and prepares the freezer for production.
When in CIP/Sanitize mode the parameter is the threshold at which the 2 programs enable and start timing at the same time the message "Low Pressure" disappears from the CIP Status Message Area on the Cleaning Screen.

Cut Out During CIP/Sanitize:
When in CIP/Sanitize mode this parameter is the threshold at which the 2 programs are halted.
At the same time the message "Low Pressure" appears on the CIP status message area.

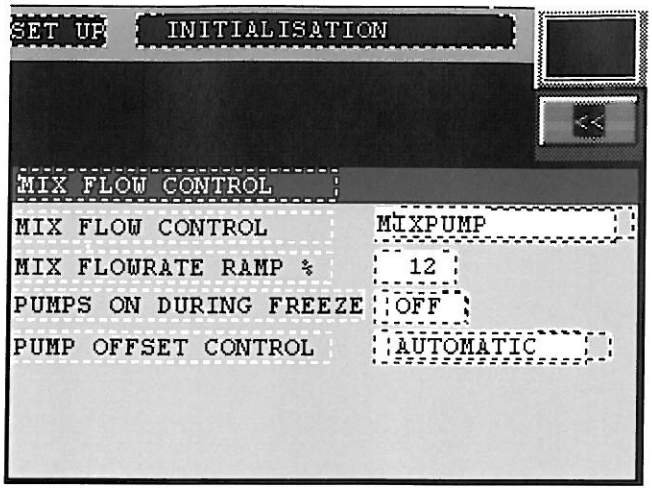


Mix Flow Filling Setting:

Cylinder Filling Level:
If the flow filling feature is enabled (Only possible with a mix flow meter) this parameter is the point At which the freezers control system, based on the actual mix flow into the freezer, terminates the filling sequence and prepares the freezer for Production.

Measured:
This is the actual mix flow measured by the mix flow meter during the filling sequence. The value will remain as long as the freezer is in production, but will be reset if a new filling sequence is started.

Mix Pump speed:
This is the mixpump speed setpoint for the filling sequence. It can be set between the min and max capacity of the pump.



Mix Flow Rate Control:

Mix Flow Control:
This parameter toggles between mix flow control on feedback from the mix flow meter or from the calibrated mix flow rate. If the freezer is equipped with Waukesha pumps this parameter must always be set to "mix flow meter".

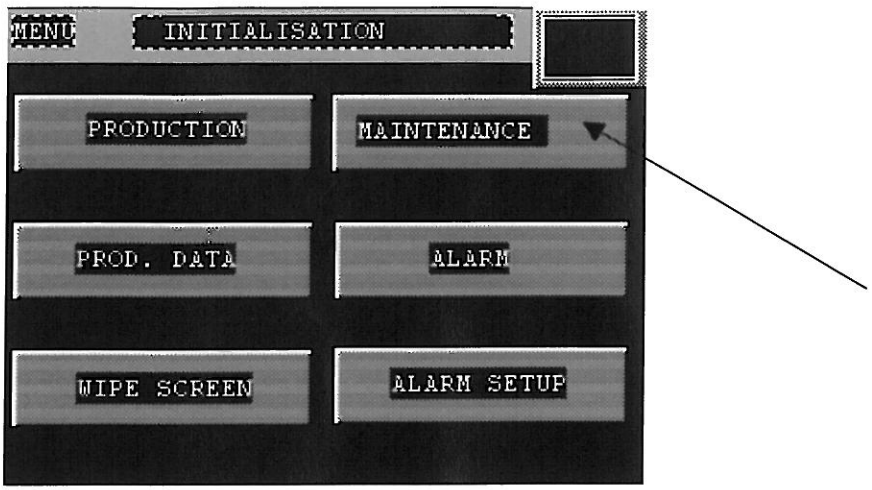
Mix Flowrate Ramp:
This parameter refers to the pump speed up time in % per minute when the freezer is going into production mode.

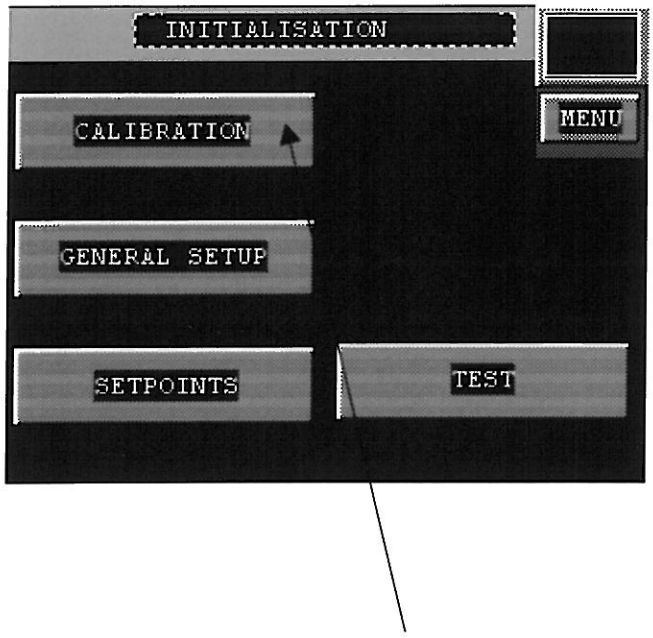
Pumps on during freezing:
By toggling this switch you can choose between running the pumps during the freezing sequence or not.

Pump Offset Control:
This parameter can be toggled between automatic and manual mode. Manual mode is normally used when producing with 0 percent overrun.

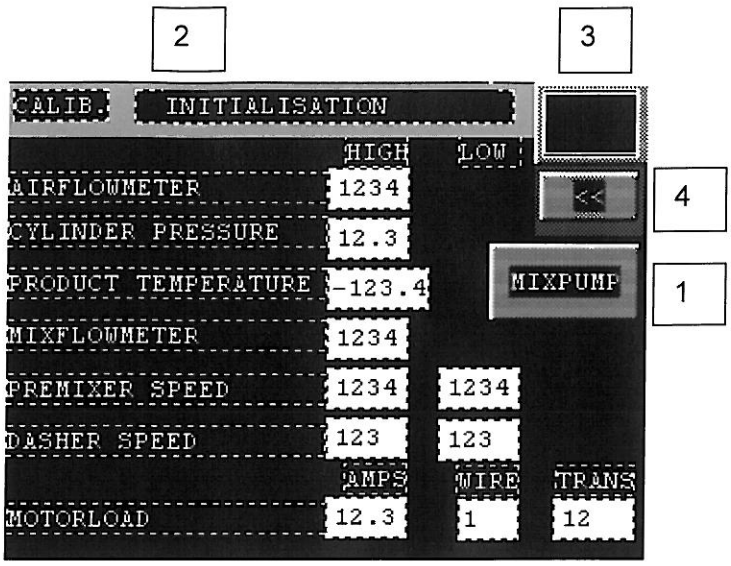
Calibration

On the Calibration screen it is possible to set the range of the various transmitters on the freezer. Normally they are factory set, but if you for instance want to fine tune the measuring you can do this by manipulating the calibration values. The routing below explains how you get to the calibration screen.





Calibration



Air Flow Meter Range:

In this parameter the maximum range of the freezers airflow meter is stated. The value is in litres per Hour.

Cylinder Pressure:

This is the full-scale value of the cylinder pressure transducer.

Product Temperature:

By changing this value it is possible to adjust the measured product temperature.

Mix Flow meter:

This is the full-scale range of the mix flow meter.

Pre-mixer Speed (Optional):

The minimum and maximum speed of the pre-mixer can be set here.

Dasher Speed (Optional):

The minimum and maximum speed of the dasher can be set here.

Motor load

Amp:
This is the nominal amperage of the dasher motor, or on cream freezers the maximum amperage of the dasher inverter. The value can be seen on the motor nameplate. The parameter is used by the control system to calculate the dasher load.

Wire:
This parameter is used to tell the control system how many times one of the dasher motor wires is pulled through the current transducer. The value is used by the control system to calculate the motor load. On cream freezers there is no amp transducer therefore this value is set to 1.

Amp Transducer:
This parameter is the range setting of the current transducer. The standard transducer has 3 ranges, which can be set on the transducer itself. By means of this feature the transducer can be easily adapted to different dasher motor sizes. The value is used by the control system to calculate the motor load. On Cream freezers there is no amp transducer. Therefore is this value set to the same as the Amp value.

1. This button calls up the mix pump calibration screen

2. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

3. Alarm Indicator

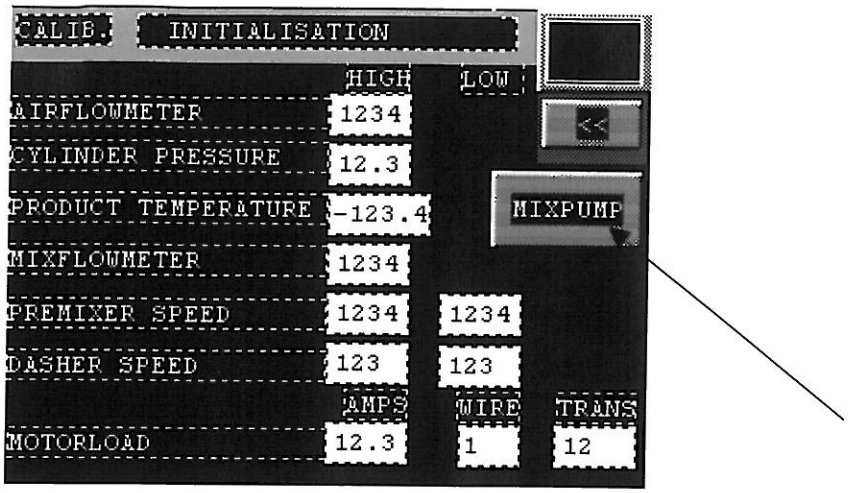
When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

4. Operator Navigation Panel

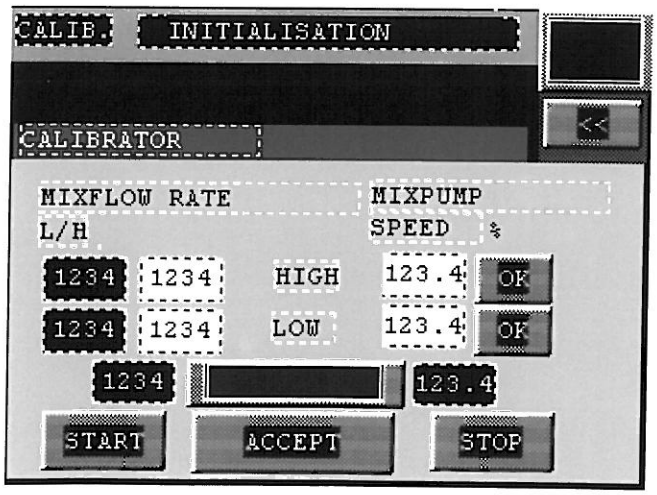
<< This button is used for returning to the maintenance main menu

Mix Pump Calibration

You get to the mix pump calibration screen by pressing the calibration button as shown below.
If the freezer is measuring mix flow by a mix flow meter the calibration is not necessary. If the freezer is without mix flow meter the calibration has to be done. As the pump rotors wear out a new calibration may be necessary.



The following section explains how to calibrate the mix pump.



Calibration Procedure.

1. Write down the original set-up no. 1 and 2 in case of an error in the calibration

2. Weigh a litre (or gallon) of mix. Record this value.

3 Adjust the mix flow set point so the current mix pump speed is at 10 %. Adjust the rate set point to obtain the 10% (The value is display no 3)

4. Measure the actual mix flow with the pump operating at 10 %.

    a. Measure the mix flow (by weight) in one minute.

    b. Divide the weight of the mix by the weight recorded in step 2 to determine number of litre (or gallons).

    c. Multiply the litre (or gallons) per minute by 60 to obtain litre (or gallons) per hour. Record this value and label it A.

5. Press the key for low pump speed (%) no. 4 and put in 10 % and enter the value labelled A in the white area for low mix flow rate no 5.

6. Adjust the mix flow set point so that the current mix pump speed is at 80 %. Adjust the mix flow rate set point to obtain the 80 % (display no 3).

7. Measure the actual mix flow with the pumps operating at 80 %
    a. Measure how much mix flow (by weight) in one minute.

    b. Divide the weight of the mix by the weight recorded in step 2 to determine number of litre (or gallons).

    c. Multiply the litre (or gallons) per minute by 60 to obtain litre (or gallons) per hour. Record this value and label it B.

8. Press the key for high pump speed (%) no. 6 and put in 80 % and enter the value labelled B in the white area for high mix flow rate (no. 7).

9. Shut down the freezer and go back in to the mix calibration screen and press the start button.

10. Press the accept key.

11. Now the control system has made a slope that is controlling the mix pump and the freezer is now ready for production.

1. Status Indicator

This area is always reporting the actual status of the freezer in plain text.

2. Alarm Indicator

When an alarm occurs this indicator will be highlighted and an A appears on the indicator. By pressing the alarm button it is possible to see the actual reason for the alarm.

3. Operator Navigation Panel

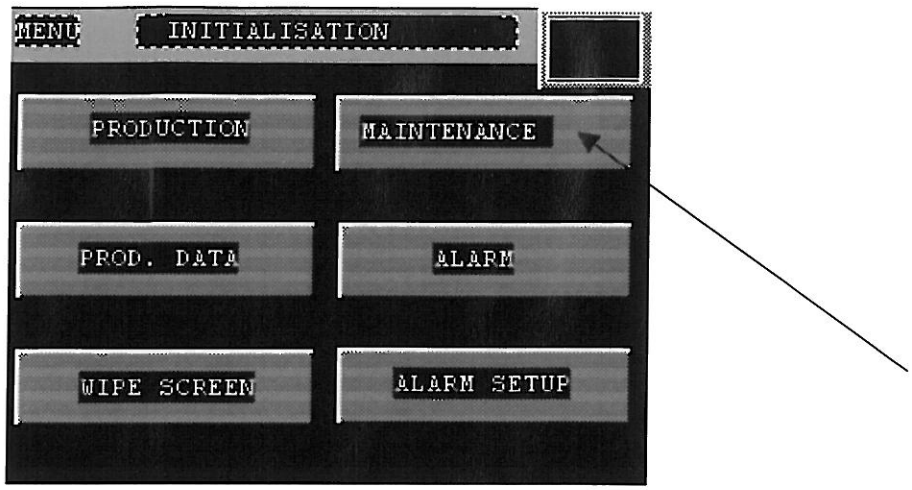
<< This button is used for returning to the maintenance main menu

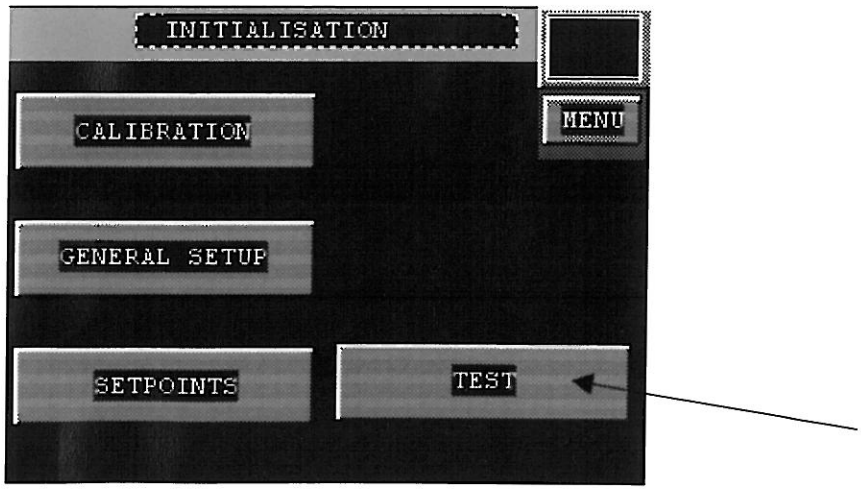
Section 3 – Master Level

This manual section describes the possibilities available for the Master user only. Please note that access to the functions requires enabling of the master password.

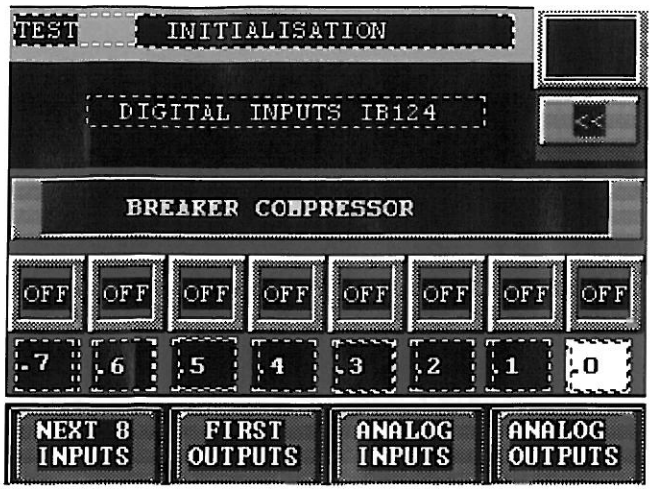
Using the Test Screen

The test screen is very useful for supervising and testing the control system. It is possible to supervise the status of the control systems input and outputs even during production. It is also possible to activate both digital and analog outputs manually and in that way testing if they are working or not.
You enter into the test screen by pressing the test button on the main maintenance menu as shown below.



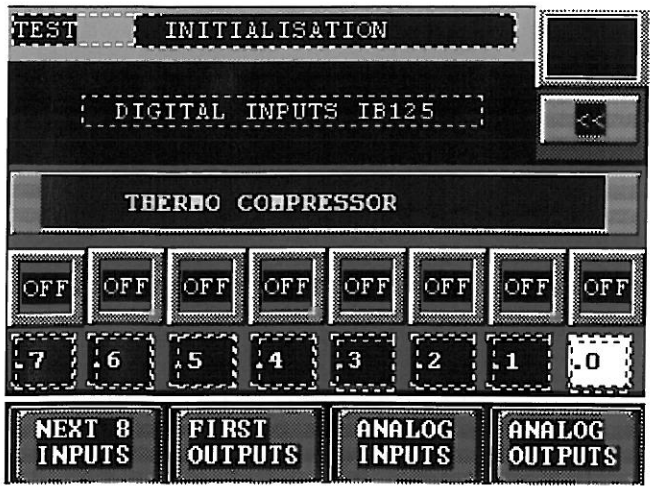


Test

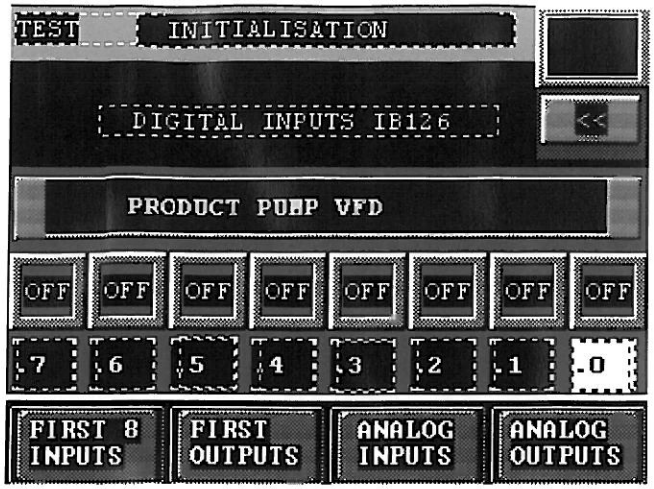


This is the first of the test screens. It is showing the status of the first 8 inputs of the freezers PLC. By pressing the numbers from 0 to 7 an explanation is clear text is displayed in the message field. It is not possible to force the status of an input.

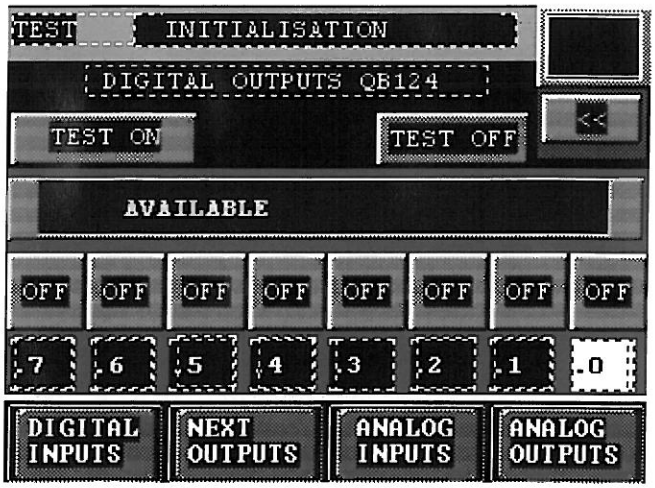
By pressing <next 8 inputs the status screen for the next 8 inputs will be displayed:



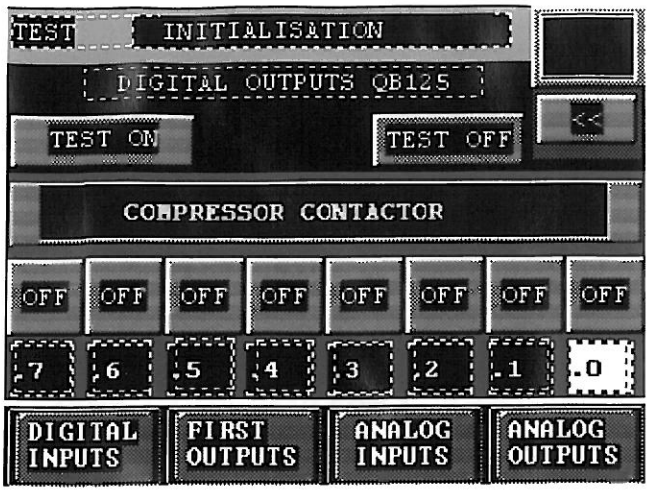
By pressing <next 8 inputs the status screen for the next 8 inputs will be displayed:



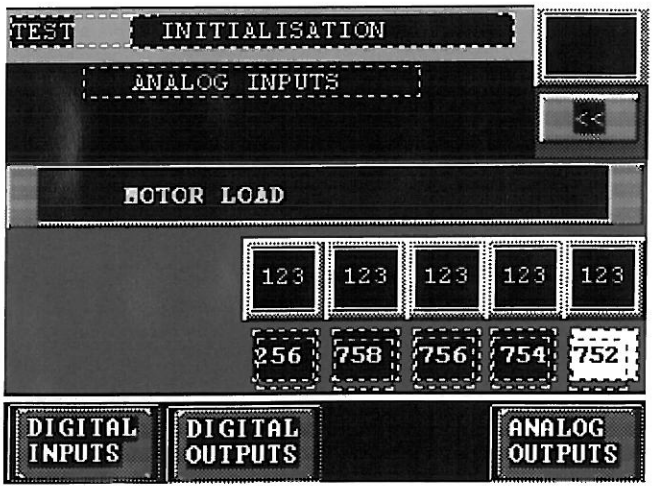
By pressing <first 8 inputs> the status screen for the first 8 inputs will be displayed.
By pressing first outputs the first 8 outputs of the freezers PLC will be displayed:



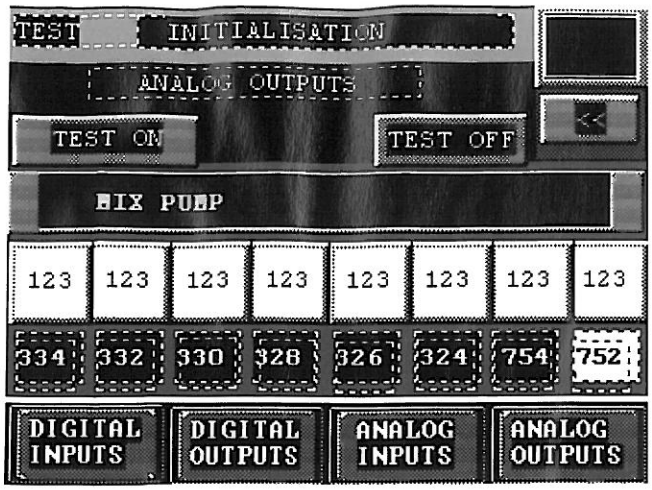
By pressing the <test on> button it is possible to force the status of the outputs. This is only possible when the freezer is in idle mode.
By pressing <test off> the test mode will be cancelled. You change the state of the outputs by pressing the on/off buttons.
When ending the test the outputs will resume the value they had before the test was activated.
By pressing <next outputs> the next 8 outputs of the freezers PLC will be displayed:



By pressing <first outputs> the first outputs of the freezers PLC will be displayed.
By pressing <analog inputs> the analog inputs of the freezers PLC will be displayed:



Note that is is only possible to monitor the status of the analog inputs. No forcing is possible. The value og the analog inputs are all scaled from 0 – 100 %.
By pressing <analog outputs> the analog inputs of the freezers PLC will be displayed:



By pressing the <test on> button it is possible to force the status of the outputs. This is only possible when the freezer is in idle mode.
By pressing <test off> the test mode will be cancelled.
You change the value of the analog outputs by touching the white area and key in the new value. When ending the test the outputs will resume the value they had before the test was activated.