

Display Case Service Manual



Service Manual



ISO 14001



ISO 9001



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Environmental Management Policy for Service Manuals and Duets.

Product Support and Installation Contractors

Foster Refrigerator recognises that its activities, products and services can have an adverse impact upon the environment.

The organisation is committed to implementing systems and controls to manage, reduce and eliminate its adverse environmental impacts wherever possible, and has formulated an Environmental Policy outlining our core aims. A copy of the Environmental Policy is available to all contractors and suppliers upon request.

The organisation is committed to working with suppliers and contractors where their activities have the potential to impact upon the environment. To achieve the aims stated in the Environmental Policy we require that all suppliers and contractors operate in compliance with the law and are committed to best practice in environmental management.

Product Support and Installation contractors are required to:

1. Ensure that wherever possible waste is removed from the client's site, where arrangements are in place all waste should be returned to Foster Refrigerator's premises. In certain circumstances waste may be disposed of on the clients site; if permission is given, if the client has arrangements in place for the type of waste.
2. If arranging for the disposal of your waste, handle, store and dispose of it in such a way as to prevent its escape into the environment, harm to human health, and to ensure the compliance with the environmental law. Guidance is available from the Environment Agency on how to comply with the waste management 'duty of care'.
3. The following waste must be stored of separately from other wastes, as they are hazardous to the environment: refrigerants, polyurethane foam, oils.
4. When arranging for disposal of waste, ensure a waste transfer note or consignment note is completed as appropriate. Ensure that all waste is correctly described on the waste note and include the appropriate six-digit code from the European Waste Catalogue. Your waste contractor or Foster can provide further information if necessary.
5. Ensure that all waste is removed by a registered waste carrier, a carrier in possession of a waste management licence, or a carrier holding an appropriate exemption. Ensure the person receiving the waste at its ultimate destination is in receipt of a waste management licence or valid exemption.
6. Handle and store refrigerants in such a way as to prevent their emission to atmosphere, and ensure they are disposed of safely and in accordance with environmental law.
7. Make arrangements to ensure all staff who handle refrigerants do so at a level of competence consistent with the City Guilds 2078 Handling Refrigerants qualification or equivalent qualification.
8. Ensure all liquid substances are securely stored to prevent leaks and spill, and are **not** disposed of to storm drains, foul drain, surface water to soil.

DISPOSAL REQUIREMENTS

If not disposed of properly all refrigerators have components that can be harmful to the environment. All old refrigerators must be disposed of by appropriately registered and licensed waste contractors, and in accordance with national laws and regulations.

User Operation Guidelines



Controller

Start Up.

The cabinet is pre set at the factory to operate in normal ambient conditions and maintain the temperature in the cabinet at -1+2 degrees.

Checking the temperature settings

Check the setpoint by pressing the **FNC** key briefly, **Sett** will be displayed, press the **OK** Key the setpoint value will displayed.

Press the **FNC** key to return to normal temperature view or leave for 5 minutes to return automatically.

Defrosting

The cabinet will automatically defrost 6 times per day and when on defrost the controller will display



On completion the display will change to  until the normal operating temperature is achieved.

Alarms and Warnings



Thermostat probe failure. Call your Foster Authorised Service Company.



Evaporator probe failure. Call your Foster Authorised Service Company.



Air probe temperature failure. Call your Foster Authorised Service Company.



Safety switch probe failure. Call your Foster Authorised Service Company.



Safety switch probe failure. Call your Foster Authorised Service Company.



Safety switch is ON and cabinet lights are OFF (alarm signal). Indicates the condenser may need cleaning. Switch the cabinet OFF, lift of the bottom front cover and clean the condenser using a soft brush and a vacuum cleaner. Replace the cover and switch the power back on. If the problem persists call your Foster Authorised Service Company.



Cabinet switches OFF due to overheating. Indicates the condenser may need cleaning. Switch the cabinet OFF, lift of the bottom front cover and clean the condenser using a soft brush and a vacuum cleaner. Replace the cover and switch the power back on. If the problem persists call your Foster Authorised Service Company.

Interruption in the mains supply.

The cabinet will start automatically after a power cut or an interruption in the power supply.

The vaporisation tray at the rear of the unit may overflow during a power cut.

Loading the cabinet

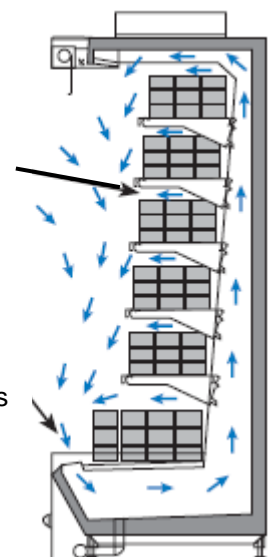
When loading the cabinet ensure that the air is retained with no obstruction to the airflow.

Do not place product in front of the inlet and outlet grills and must not protrude over the front edges of the shelves.

Improper loading will effect the operation of the cabinet.

Ensure 20mm clearance between the bottom of the shelves and the product.

Do not obstruct air channels



Information Menu

Pressing and releasing **FNC** will access the information menu, use the **UP** or **DOWN** keys to scroll through and press **OK** to display the value.

The first in the menu is **Sett**; this indicates the set value, press **OK** to display the value.

Release **OK** and **Nd** will be displayed; this indicates the next defrost time in hours and minutes, press **OK** to display the value.

Release **OK** and **Pb1** will be displayed; this is the temperature indicated by the Thermostat Probe, press **OK** to display the value.

Release **OK** and **Pb2** will be displayed; this is the temperature indicated by the Evaporator Probe, press **OK** to display the value.

Release **OK** and **Pb3** will be displayed; this is the temperature indicated by the Cabinet Probe, press **OK** to display the value.

Release **OK** and **Pb4** will be displayed; this is the first Condenser Alarm Probe, press **OK** to display the value.

Release **OK** and **Pb5** will be displayed; this is the second Condenser Alarm Probe, press **OK** to display the value. (Only used on models with two condensing units)

Release **OK** and **Con** will be displayed; this indicates which compressor is running. (Most cases have only 1 compressor but some have 2)

Release **OK** and **C1t** will be displayed; this indicates how many hours the first compressor has been running.

Release **OK** and **C2t** will be displayed; this indicates how many hours the second compressor has been running.

Press **FNC** to return to the main display.

User Menu

Press and hold **FNC** for 5 seconds to enter the user menu use the **UP** or **DOWN** keys to scroll through and press **OK** to display the value.

See the cabinet parameters on page 4 for the correct settings.

Service Access and Parameters

To access press and hold **OK** for 5 seconds and the display will show **0000**.

The password is **1953**.

Set the first number by using the **UP** or **DOWN** key, once selected press **OK** to move to the next number.

Once the number is completed correctly press **OK** to access the parameters and use the **UP** and **DOWN** keys to change the values. Once the change has been completed press **OK** to move to the next parameter.

Parameter Definitions

Set Point values for group 1- folder (St1)

St1 Set point value
The set point value for the first set of control parameters.

dIF1 Differential
The temperature difference for the stopping and starting of the compressor. Must be a positive value

dIt1 Time interval between defrosts

dEt1 Maximum duration of defrost.

dSt1 Temperature at which the defrost is terminated

dt1 Drying time after the termination of a defrost

Set Point values for group 2- folder (St2)

St2 Set point value
The set point value for the first set of control parameters.

dIF2 Differential
The temperature difference for the stopping and starting of the compressor. Must be a positive value

DIt2 Time interval between defrosts

dEt2 Maximum duration of defrost.

dSt2 Temperature at which the defrost is terminated

dt2 Drying time after the termination of a defrost

The group 2 values are only used on selected models.

Service Menu

Settings folder (Set)

SetC Parameter List
Set point value group for user menu 1 and 2

UloC Keyboard Lock
Locks the controller and disables the user menu and manual defrost.

St1 Set Point Value
Set point for the first control settings

SL1 Lower Set Limit
Minimum temperature set point for the first control settings

SH1 Upper Set Limit
Maximum temperature set point for the first control settings

C1 Compressor Mode
1 = One compressor: 1 = Two compressors: 3 = Compressor Cycling.
If more than one compressor is fitted both will run until the setpoint value is reached. After this the compressor with the most operating hours stops. When the cabinet temperature rises and reaches the restart temperature both compressors will run.

St2 Set Point Value
Set point for the second control settings

SL2 Lower Set Limit
Minimum temperature set point for the second control settings

SH2 Upper Set Limit
Maximum temperature set point for the second control settings

C2 Compressor Mode
1 = One compressor: 1 = Two compressors: 3 = Compressor Cycling.
If more than one compressor is fitted both will run until the setpoint value is reached. After this the compressor with the most operating hours stops. When the cabinet temperature rises and reaches the restart temperature both compressors will run.

dSnC Defrost synchronization

Probe folder (SEn)

SC Amount of Probes
The number of probes fitted to this model

dISP Local Display
Allows the selection of a particular probe temperature to be displayed on the controller.
1 = Thermostat probe; 2 = Evaporator probe; 3 = Cabinet probe; 4 and 5 = Condenser alarm probes

dECP Resolution
Allows for a decimal point to be displayed.
0 = Not in use; 1 = in use

FC Filter Factor
This is a constant parameter used to stabilise the reading shown on the display. The value is always the same and it keeps the readings stable.

oFFS Display Temperature Offset
Allows for the cabinet probe and LCD display to be adjusted up or down to suit certain site requirements

C1Pd Condenser Overheat Probe 1
Selects the probe used.

C2PD Condenser Overheat Probe 1
Selects the probe used.

Compressor Folder (CP)

d Defrost Mode
Selects the type of defrost used
0 = Electrical Defrost; 1 = Hot gas defrost

L on Min. Working Time
Minimum working time for the compressor

H on Max. Working Time
Maximum working time for the compressor

oFFt Compressor off-time
Compressor off time if maximum working time (**H on**) is achieved

CoFF Min. Down Time
Minimum down time of compressor

rAtE Cooling Rate
Percentage of the cooling frequency in probe failure

2dIF Compressor Difference (Not used)

Condenser Overheat Folder (OH)

AL Alarm Temperature
Temperature at which the condenser alarm will be activated

Alt Alarm Temperature Delay
Time in minutes that the alarm will be delayed

Sd Shutdown Temperature
Temperature at which the cabinet turns itself off due to high condenser temperature.

Sdt Shutdown Temperature Delay
Time delay before the cabinet shuts down due to too high condenser temperature

Net Folder (nEt)

nID Device Identification

CAL1 Thermostat Probe Calibration
Calibration according to factory test run.

Standard Setting Folder (SdFt)

Press **OK** to restore the controller to the standard settings (NOTE; not the cabinet's factory settings)

Foster Display Case Parameter Settings

Model			NRC100 Default C1.0-15/08	FPREM 125HG	FPREM 195HG	FPRO 90HG	FPRO 130HG	FPRO 195HG	MINI FM90 130HG	MINI FM120 130HG	MINI FM90 150HG	MINI FM120 150HG	Slim FS70 HW	Slim FS90 HW	Slim FS120 HW
User Menu															
Temperature Set Point 1		(ST1)													
Set Point Value	°C	St1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	+2	+1	+1
Differential	°C	diF1	3	3	3	4	4	4	4	4	4	4	3	3	3
Defrost Interval	H	Dt1	4	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Defrost Duration	min	dEt1	35	35	35	35	35	35	35	35	35	35	35	35	35
Defrost End Temperature	°C	dSt1	11	11	11	11	11	11	11	11	11	11	11	11	11
Drain Down Time	min	Dt1	0	0	0	0	0	0	0	0	0	0	0	0	0
Temperature Set Point 2 (if in use)		(ST2)													
Set Point Value 2	°C	St2	-20												
Differential 2	°C	diF2	2												
Defrost Interval 2	H	dit2	6												
Maximum Defrost Duration 2	min	dEt2	45												
Defrost End Temperature 2	°C	dSt2	11												
Drain Down Time 2	min	dt2	0												
Service Menu															
Settings Folder		(SEt)													
Parameter List		SetC	1	1	1	1	1	1	1	1	1	1	1	1	1
Keyboard Lock		UlocC	0	0	0	0	0	0	1	1	1	1	0	0	0
Setpoint Value	°C	St1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	+1	+1	+1
Lower Set Limit	°C	SL1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Upper Set Limit	°C	SH1	10	10	10	10	10	10	10	10	10	10	10	10	10
Compressor Mode		C1	1	2	2	1	1	2	1	1	1	1	1	1	1
Setpoint Value 2	°C	St2	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
Lower Set Limit 2	°C	SL2	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30
Upper Set Limit 2	°C	SH2	10	10	10	10	10	10	10	10	10	10	10	10	10
Compressor Mode 2		C2	1	1	1	1	1	1	1	1	1	1	1	1	1
Defrost synchronization		dSnC	0	0	0	0	0	0	0	0	0	0	0	0	0
Probe Folder		(SEn)													
Amount of Probes	pcs	SC	4	4	5	4	4	4	4	4	4	4	4	4	4
Local Display		dISP	3	3	3	3	3	3	3	3	3	3	3	3	3
Resolution		dECP	0	0	0	0	0	0	0	0	0	0	0	0	0
Filter Factor		FC	7	7	7	7	7	7	7	7	7	7	7	7	7
Display Temperature Offset		oFFS	0	0	0	0	0	0	0	0	0	0	0	0	0
Condenser Overheat Probe 1		C1Pd	4	4	4	4	4	4	4	4	4	4	4	4	4
Condenser Overheat Probe 2		C2PD	4	4	5	4	4	4	4	4	4	4	4	4	4
Compressor Folder		(CP)													
Defrost Mode		d	0	0	0	0	0	0	0	0	0	0	0	0	0
Min. Working Time	min	L on	0	0	0	0	0	0	0	0	0	0	0	0	0
Max. Working Time	min	H on	60	60	60	45	45	45	60	60	60	60	60	60	60
Compressor off-time	min	oFFt	5	5	5	5	5	5	5	5	5	5	5	5	5
Min. Down Time	min	CoFF	2	2	2	2	2	2	2	2	2	2	2	2	2

Cooling Rate	%	rAtE	70	70	70	70	70	70	70	70	70	70	70	70	70
Compressor Difference		2dlF	2	2	2	2	2	2	2	2	2	2	2	2	2
Condenser Overheat Folder		(OH)													
Alarm Temperature	°C	AL	50	50	50	47	47	47	50	50	50	50	47	47	47
Alarm Temperature Delay	min	Alt	2	2	2	2	2	2	2	2	2	2	2	2	2
Shutdown Temperature	°C	Sd	55	55	55	52	52	52	55	55	55	55	55	55	55
Shutdown Temperature Delay	min	Sdt	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Folder		(nEt)													
Device Identification		nID	0	0	0	0	0	0	0	0	0	0	0	0	0
Thermostat Probe Calibration		CAL1	-*	-*	-*	-*	-*	-*	-*	-*	-*	-*	-*	-*	-*
Return NRC-100 Default settings NOTE: Not Cabinet Settings	SdFt	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*) Calibration according to factory test run.

**) Gas Defrost = 1

***) Gas defrost = 0

****) Gas defrost = 15

Technical Specification

Model	Compressor cm3	Total Power Input (W) (Thermal Heat Rejection)	Run Amps	Compressor Run Watts	Compressor Start Current	Fuse	kWh/24h	dB (A)
PREM 125	15 + 15	2022	10.8	1360	20A*	13A	43.0	<59
PREM 195	18 + 18	2934	14.8	1800	20A*	16A	63.2	<59
PRO 90	18	1688	8.3	900	20A	13A	35.8	<59
PRO 130	21	2058	9.9	910	20A	13A	43.9	<59
PRO 195	14 + 14	2954	14.8	1360	20A*	16A	63.7	<59
SLIM 70	10	1248	6.4	460	20A	13A	25.5	<56
SLIM 90	14	1468	7.4	680	20A	13A	30.1	<56
SLIM 120	18	1710	8.4	900	20A	13A	35.1	<56
MINI 90	14	1414	7.1	680	20A	13A	29.5	<56
MINI 120	18	1684	8.3	900	20A	13A	35.3	<56

* For cabinets with 2 compressors fitted there is a 20 second delay between compressor starts so the start current of 20A is not exceeded.

The suction pressure as per climate class 3 (see below) is between -8 and -10 °C approximately 3.5 bar, with a discharge temperature of +40 °C (clean condenser) approximately 17.3 bar.

The cases are designed to work in an ambient temperature not exceeding 25 degrees centigrade (C) with a relative humidity not exceeding 60% (RH) Climate Class 3.

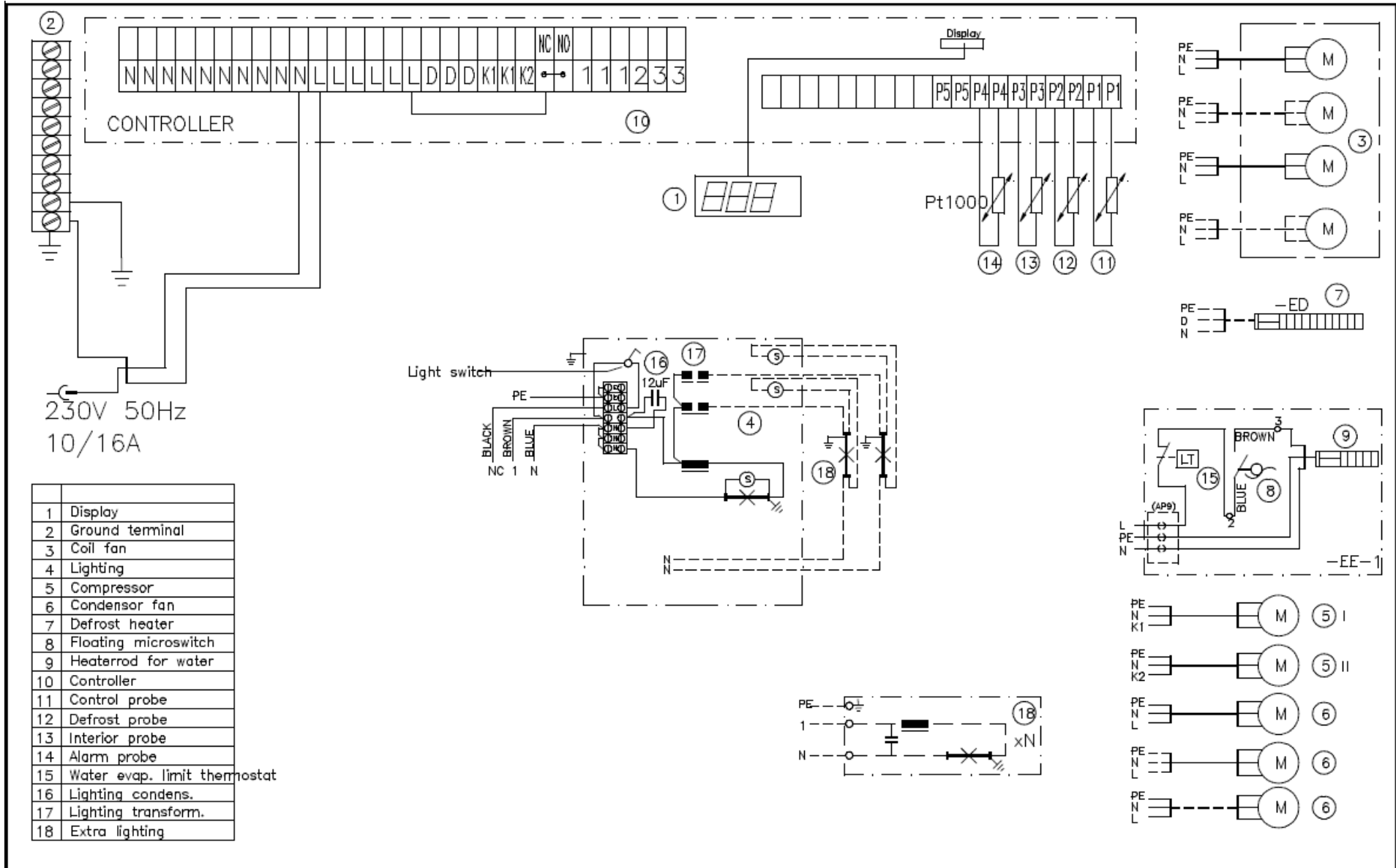
The frontal airflow should be < 0,2m/s

Probes

The probes used are **PT-1000** with rating at 0° C of 1000 Ohms. There is not a temperature range but the resistance value is approximately 950 Ohms at - 10° C and 1200 at + 50° C.

Case Faults and Possible Solutions

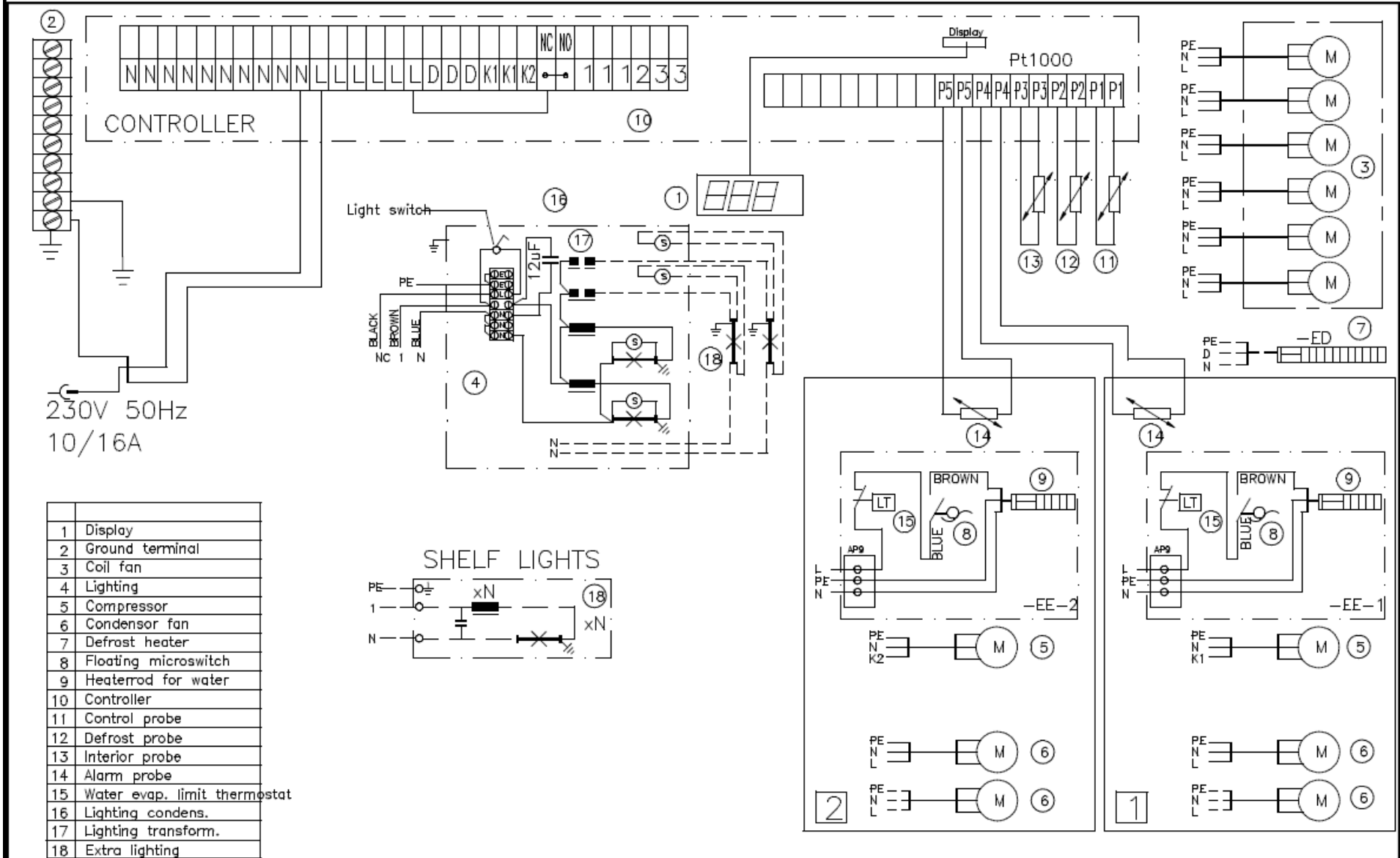
No	Problem	Possible Cause	Solution
1	Display Shows ERR1 ERR2 ERR3 ERR4 ERR5	Probe Failure, Probe with the same number broken or has a bad connection 1 = Thermostat Probe 2 = Defrost Probe 3 = Cabinet Probe 4 = Condenser Overheat Probe 5 = Condenser Overheat Probe	Check connection or change probe.
2	Display shows Err6 and the cabinet lights are off = Condenser Overheat Alarm	Indicates dirty condenser or condenser motor failure. Condenser blocked or cabinet too close to the wall	Check / Clean condenser Change fan motor Check for sufficient clearance at rear of machine
3	Display Shows Off = Cabinet shut down due to condenser overheat	Indicates dirty condenser or fan motor failure.	Check Condenser cleanliness Check condenser fan motor and refrigerant circuit function
4	Display shows off when plugging in the cabinet after changing the controller	1) Parameter C2Pd in SEn folder set wrong. Value should be 4 when cabinet with 1 condenser (=4 probes). <u>NOTE! Off-text appears with 1-2 min delay after starting up the cabinet.</u> 2) Parameter Sdt (shut down delay) is set to 0 min. <u>NOTE! Off-text appears directly after starting up the cabinet</u> 3) Probe 4 or 5 broken or badly connected. <u>NOTE! Err 4 (or Err 5) text appears directly after plugging in the cabinet. Off-text appears with 1-2 min delay</u>	1) Change parameter C2Pd to 4 2) Change parameter Sdt to 1 3) Change probe/s 4 or 5. Check connection
5	Display shows 8888 or shows nothing	1)Start Failure 2) Display or display cord failure 3) Controller failure NOTE! Start failure fixed in NRC-100 with software version C1.0 or later (manuf. date 15/08 or later)	1) Disconnect the cabinet and plug in again. 2) Change display or display cord 3) Change controller
6	Display shows radically other value than 0...5° under normal running conditions	1) Cabinet set too cold 2) Other probe than cabinet temperature probe (e.g. 3) showing on the display 3) Probes incorrectly connected	1) Change St1 value 2) Check parameter dISP (cabinet temperature = 3) 3) Check connections
7	Compressor Cut-in and Cut-outs not following Set-value (and the differential)	Cabinet running on minimum running time(Lon) and minimum stop time (CoFF)	If the cabinet temperature is OK there is no need for service. If the products is too cold raise the set value, and if necessary increase the differential
8	Parameter values not possible to set as whole numbers (e.eg. 1.0, 2.0, 3.0 and so on	Controller malfunction	Change controller



WIRING DIAGRAM
FMPREM 125H

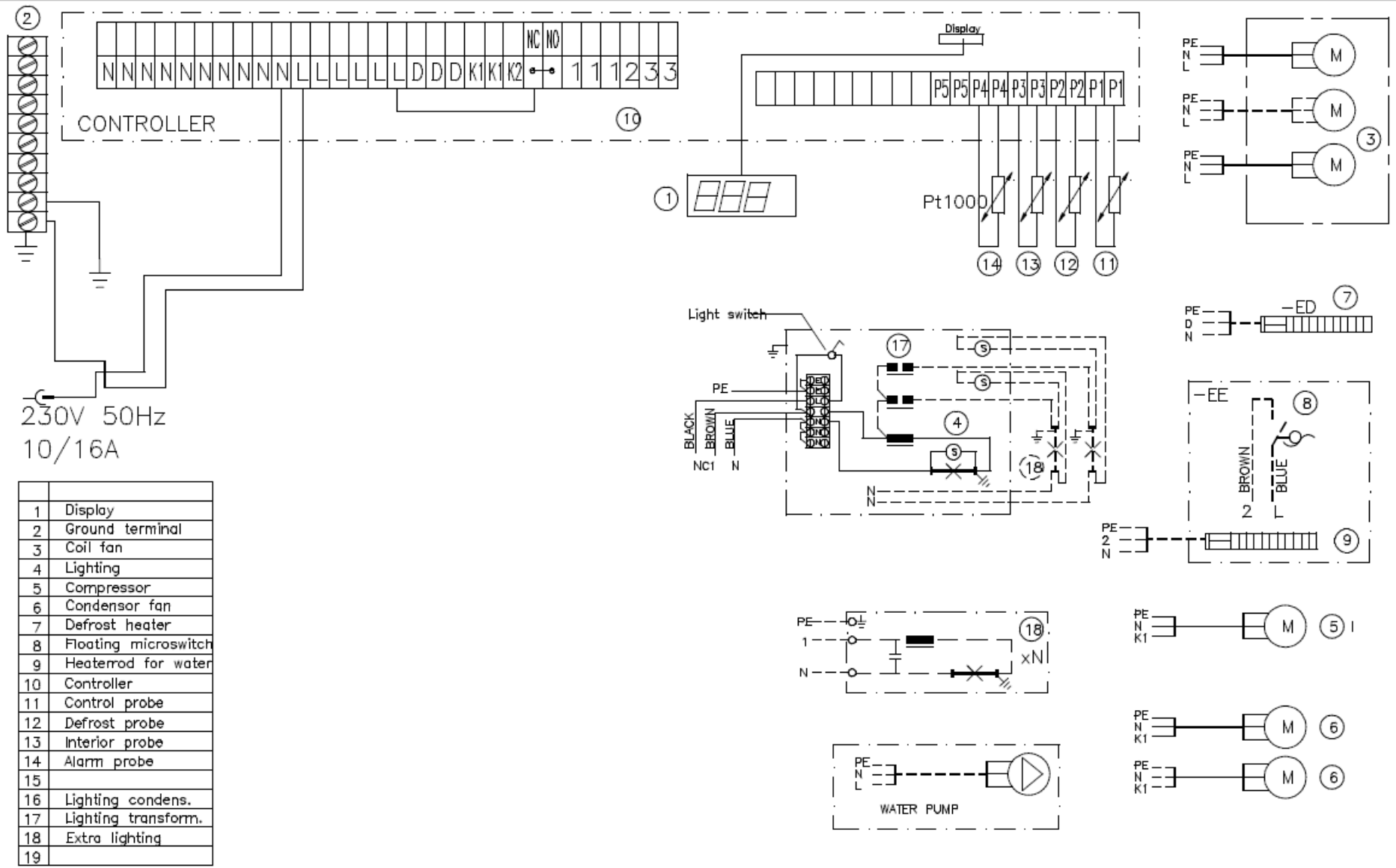


2207-F
5.11.07 LK



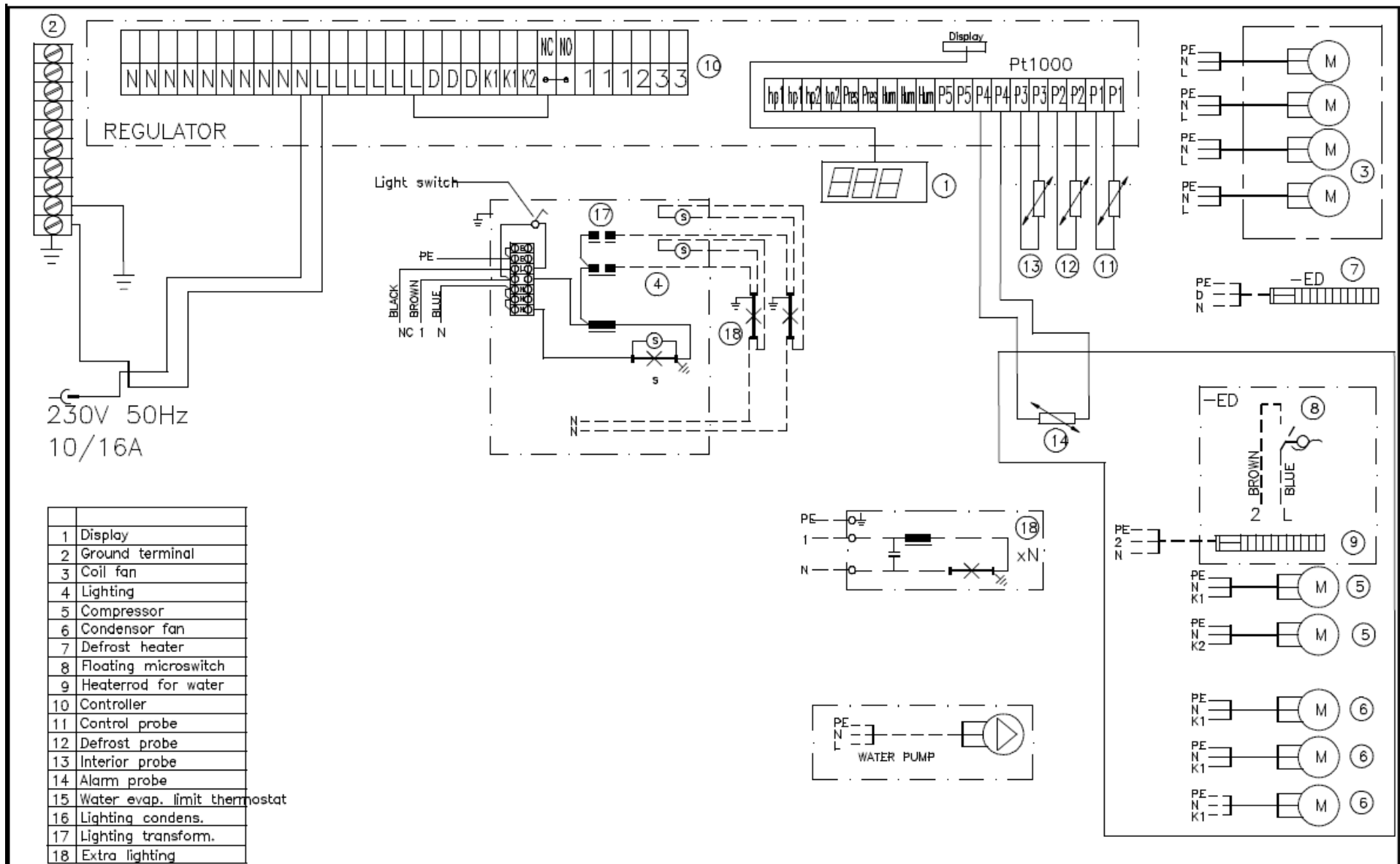
WIRING DIAGRAM
FMPREM 195H

2208-F
5.11.07 LK



WIRING DIAGRAM
FMPRO 90H 1304

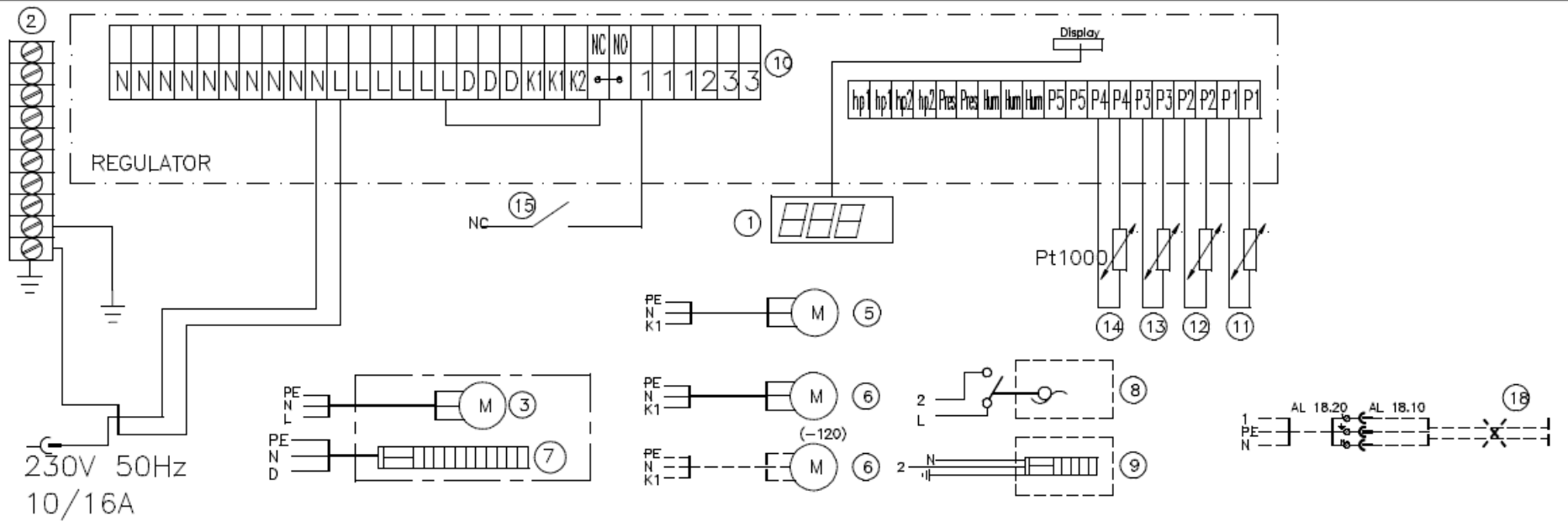
2230-F
5.11.07 LK



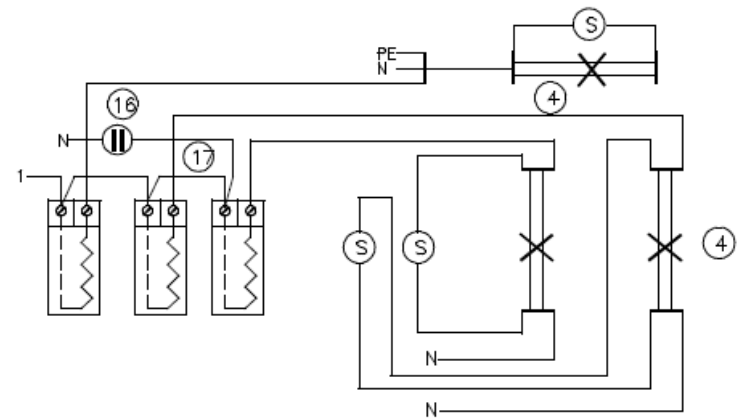
WIRING DIAGRAM
FMPRO 195

2231-F

5.11.07 LK

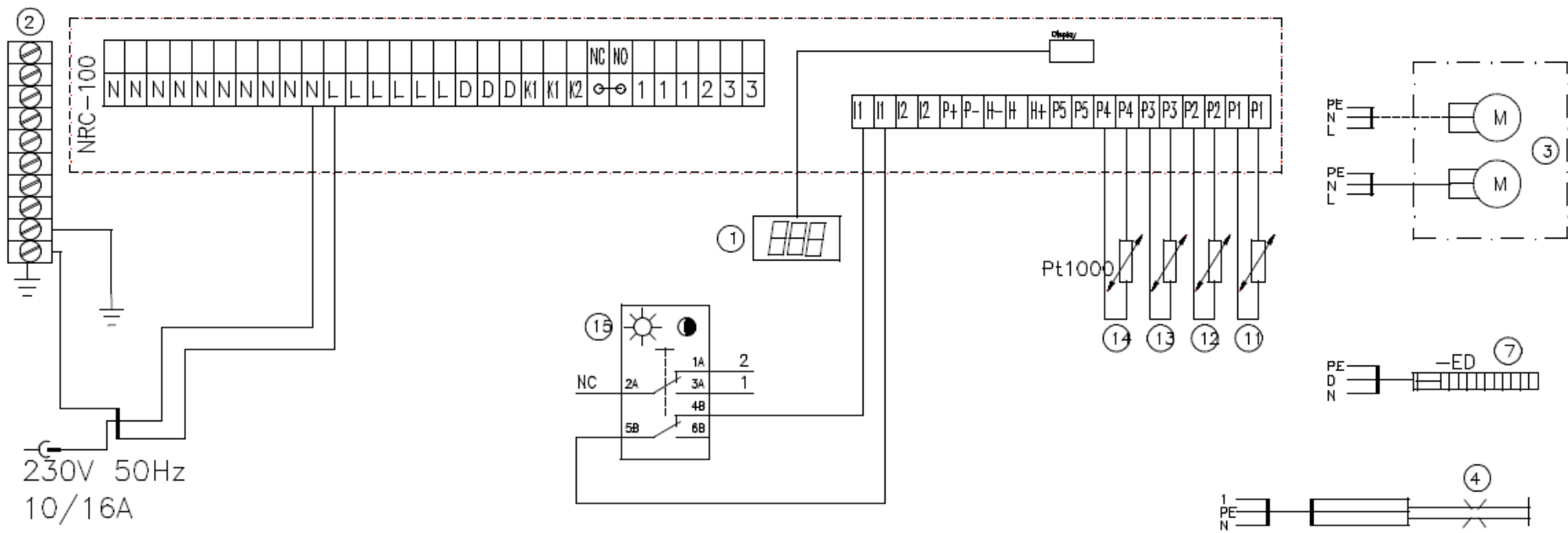


1	Display
2	Ground terminal
3	Coil fan
4	Lighting
5	Compressor
6	Condensar fan
7	Defrost heater
8	Floating microswitch
9	Heaterrod for water
10	Controller
11	Control probe
12	Defrost probe
13	Interior probe
14	Alarm probe
15	Light switch
16	Lighting condens.
17	Lighting transform.
18	Extra lighting
19	



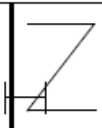
WIRING DIAGRAM
FMSLIM 70H 90H 120H

2249-F
5.11.07 LK

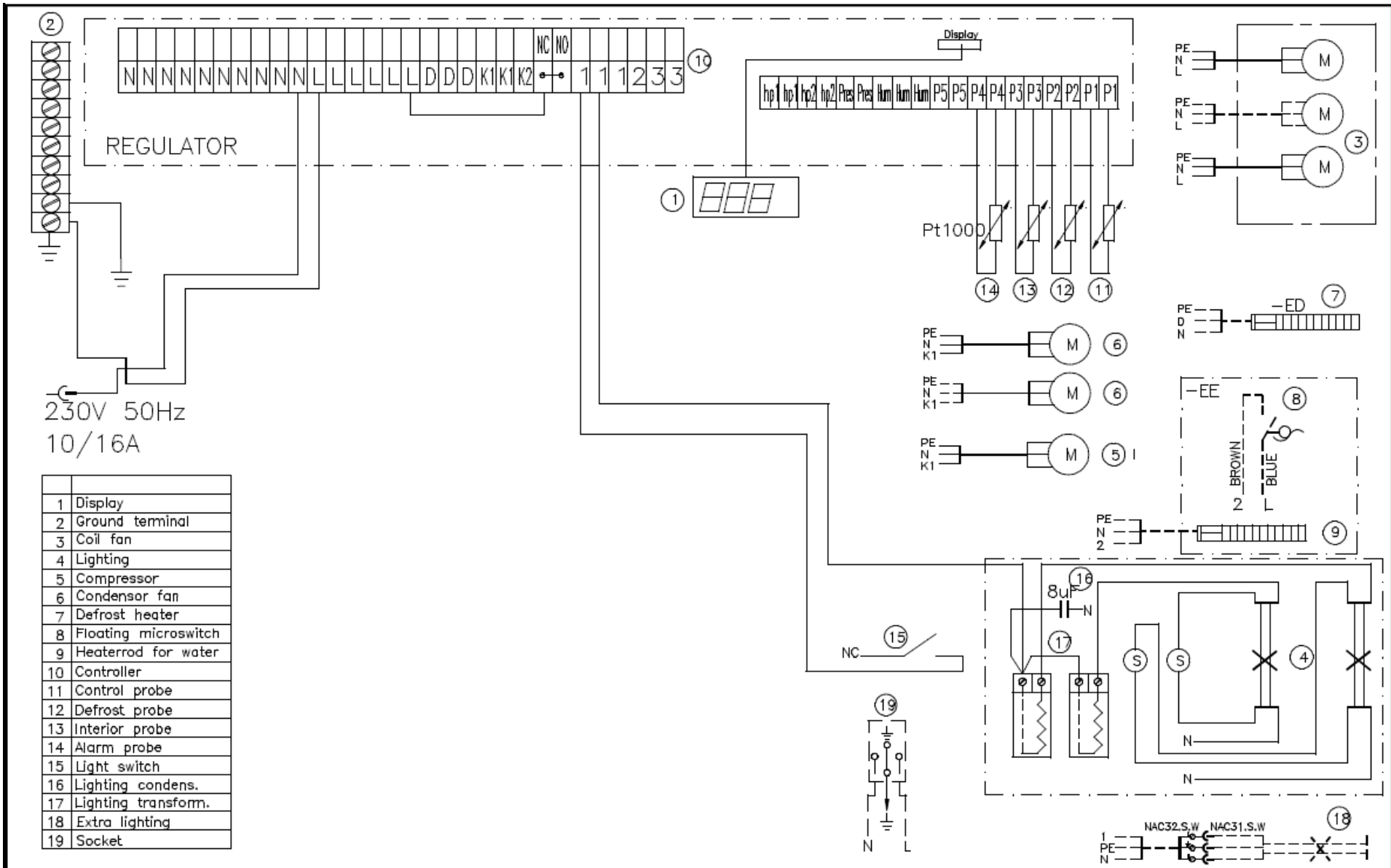


1	Display
2	Ground terminal
3	Coil fan
4	Lighting
5	Compressor
6	Condensor fan
7	Defrost heater
8	Water evap. fan
9	Heating wire
10	Controller
11	Control probe
12	Defrost probe
13	Interior probe
14	Alarm probe
15	Light switch
16	
17	
18	

WIRING DIAGRAM
FSLIM 186



2468-F
8.12.08 JT/L



1	Display
2	Ground terminal
3	Coil fan
4	Lighting
5	Compressor
6	Condensor fan
7	Defrost heater
8	Floating microswitch
9	Heaterrod for water
10	Controller
11	Control probe
12	Defrost probe
13	Interior probe
14	Alarm probe
15	Light switch
16	Lighting condens.
17	Lighting transform.
18	Extra lighting
19	Socket

WIRING DIAGRAM
FM MINI 90 120 / 130H

2246-F
5.11.07 LK



Foster European Operations

France

Foster Refrigerator France SA

Tel: (33) 01 34 30 22 22. Fax: (33) 01 30 37 68 74.

Email: commercial@fosterfrance.com

Germany

Foster Refrigerator GmbH,

Tel: (49) 781 990 7840. Fax (49) 781 990 7844.

Email: info@foster-gmbh.de

Foster Refrigerator

Oldmedow Road

Kings Lynn

Norfolk

PE30 4JU

Tel: 01553 691122

Fax: 01553 691447

Website: www.fosterrefrigerator.co.uk

Email: sales@foster-uk.com

a Division of 'ITW (UK) Ltd'

Foster Display Case/SM 03/09