FOSTER
REFRIGERATOR

Display Case

FHG 2L & FHG 3L

SERVICE MANUAL

Foster Refrigerator Environmental Management Policy
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.

Introduction
The display case are manufactured in two formats FHG 2L, 2 doors, and the FHG 3L, three doors.
There are also Multiplex options that are a combination of two FHG 2L cases to make a FHG 4L or a combination of the FHG 2L and FHG 3L to make a FHG 5L.

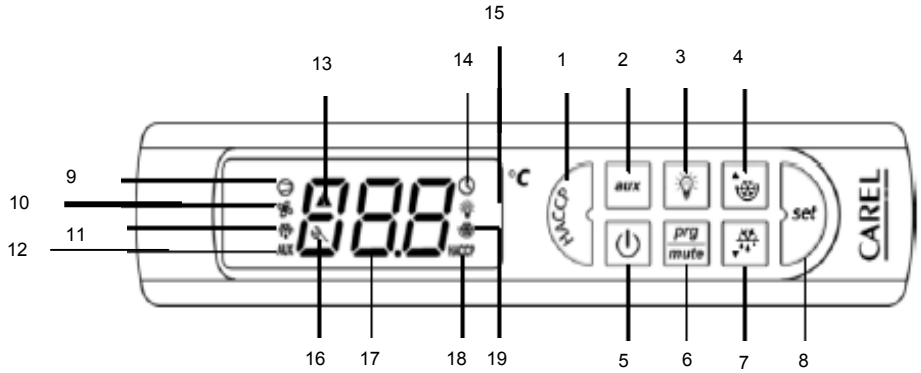
Technical Specification.

Model		**2 Door**	**3 Door**	**4 Door**	**5 Door**
External Dimensions (m)	Height (m)	2100	2100	2100	2100
	Width (m)	1684	2463	3254	4035
	Depth (m)	900	900	900	900
Internal Dimensions (m)	Height (m)	1354	1354	1354	1354
	Width (m)	1564	2343	3128	3907
	Depth (m)	550	550	550	550
No. of Shelves		12	18	24	30
Shelf capacity (each)	Kg	40	40	40	40
Door System		Schott	Schott	Schott	Schott
Refrigeration System					
Compressor	Up to Aug 2004	Hitachi FL200 DL 400v 3 phase		Hitachi FL200 DL 400v 3 phase (x 2)	
	From Aug 2004	Hitachi DS 183651 230v 1 phase		Hitachi DS 183651 230v 1 phase (x 2)	
			Hitachi FL300DL 400 3 Phase		Hitachi FL300DL 400 3 Phase (x 2)
Refrigerant		R404A 2500 grms	R404A 3500 grms	R404A 2500 grms (x 2)	R404A 2500 grms + 3500 grms
Vaporisation		Hot Gas	Hot Gas	Hot Gas	Hot Gas
Defrost Type		Hot Gas and Electric (1 kW)	Hot Gas and Electric (1.5 kW)	Hot Gas and Electric (2.1kW)	Hot Gas and Electric (2.5 kW)
Electrical supply		230/1/50	400/3/50	230/1/50 X 2	400/3/50 + 230/50/1
Electrical Supply Capacity		16A	16A	16A	16A
Controller		Carel PB00F0HB10	Carel PB00F0HB10	Carel PB00F0HB10	Carel PB00F0HB10
Heat loads & Consumption					
Lighting	Watts	140	210	280	350
Door frame heaters	Watts	266	380	522	646
Fan motors	Watts	132	198	264	330
Compressor consumption	Watts		2760		
Compressor Duty	Watts		2660		
Compressor Current	A		5.1		

Temperature controller

It is strongly advised that before adjusting any Service Parameters a thorough understanding of the following instructions should be obtained.

Carel PB00F0HB10



Controller Display and Symbols.

NOTE: When the buttons are pressed a brief audible signal is emitted; this signal can not be disabled.

1. **HACCP:** Pressing this button displays a sub menu used to access the HACCP parameters (not used by Foster)

2. **ON/OFF:** When pressed for more than 5 seconds switches the controller on/off. When OFF the controller display alternates between “OFF” and the air temperature as read by the air probe.

3. **PRG/MUTE:** Mutes the audible alarm and deactivates the alarm relay.
   : If pressed for more than 1 second the during the reception of the automatic network address assignment request package, starts the address assignment procedure (not used by Foster).
   : If pressed for more than 5 seconds, allows access to the menu for setting the “F” (frequent) parameters.

   : If pressed for more than 5 seconds together with, allows access for setting the “C” (configuration) Parameters.
   : If pressed for more than 5 seconds when switching the instrument ON, activates the procedure for setting the default parameter values.

   : If pressed for more 5 seconds together with, resets any active alarm with manual reset (the message ‘rES ‘ indicates that the alarm has been reset); any delays relating to the alarms are re-activated.

4. **UP/CC:** If pressed for more than 5 seconds, activates/deactivates the continuous cycle operation (the message ‘ccE’ and ‘ccE’ indicate, respectively, the start and end of the continuous cycle request).

   : If pressed together with, for more than 5 seconds, starts the report printing procedure (provided the printer interface is connected to the controller).

   : If pressed for more than 5 seconds together with, resets any active alarm with manual reset (the message ‘rES ‘ indicates that the alarm has been reset); any delays relating to the alarms are re-activated.

5. **Light:** If pressed for more than 1-second activates/deactivates auxiliary output 2.

6. **AUX:** If pressed for more than 1-second activates/ deactivates auxiliary output 1.

7. **DOWN/DEF:** If pressed for mare than 5 seconds, activates/deactivates a manual defrost (the message ‘dFb’ and dFE’ indicate, respectively, the start and end of defrost).

8. **SET:** If pressed for more than 1 second displays and/or sets the set point.
   : If pressed for more than 5 seconds together with, accesses the menu for setting the type ”C” (configuration) parameters.
   : If pressed together with for more than 5 seconds, starts the report printing procedure (provided the printer interface is connected to the controller).

9 **Compressor:** Illuminated when the compressor is running. Flashes when the activation of the compressor is delayed by safety times.

10. **FAN:** Illuminated when the fan starts. Flashes when the activation of the fan is prevented due to external disabling or procedures in progress.

11. **DEFROST:** Illuminated when defrost is activated. Flashes when the activation of the defrost is prevented due to external disabling or procedures in progress.

12. AUX **AUX:** Illuminated when the auxiliary output (1 and/or 2) selected as AUX is activated.

13. **ALARM:** Illuminated following the activation of the external digital input alarm. Flashes in the event of alarms during normal operation (e.g. high /low temperature) or in the event of alarms from an external digital input, immediate or delayed.

14. **CLOCK:** Illuminated if at least one timed defrost has been set. On start up comes ON for a few seconds to indicate that the Real Time Clock is active.

15. **LIGHT:** Illuminated when the auxiliary output (1 and /or 2) is selected as the LIGHT is activated.

16. **SERVICE:** Flashes in the event of a malfunction, for example EPROM errors or probe faults.

17. **DISPLAY:** Displays the temperature in the range –50 to +150°C. the temperature is displayed to the tenth of a degree between –19.9 and + 19.9°C. the display of the tenths can be disabled by setting the related parameter.

18. HACCP **HACCP:** Illuminated if the HACCP function is enabled. Flashes when there are hew HACCP alarms stored (HA and/or HF alarm shown on the display).

19. **CONTINUOUS CYCLE:** Illuminated when the CONTINUOUS CYCLE function is activated. Flashes if the activation of the function is prevented due to external disabling or procedures in progress (e.g. minimum compressor OFF time).

Setting the set point.

To display the set point proceed as follows:

1. Press SET for more than 1 second to display the set point.
2. To increase the set point press ▲ or to decrease the set point press ▼ until the desired value is reached.
3. To confirm the value press SET.

Programming the controller.

The parameters can be modified using the front keypad.
The operating parameters are divided into two families: Frequent parameters (type “F”) and configuration parameters (type “C”).
Access to the configuration parameters is protected by a password that prevents unwanted modification or access by unauthorised persons.

Accessing the type “F” parameters.

Press PRG for more than 5 seconds (if an alarm is active, the buzzer is muted), the display shows the code of the first modifiable type “F” parameter.

Accessing the type “C” parameters.

1. Press PRG and SET together for more than 5 seconds; the display will show the number “00”.
2. Press ▲ until the display shows “22” (the code allows access to the parameters)

3. Confirm by pressing  .

4. The display shows the code of the first modifiable type “C” parameter.

Modifying the parameters.

After having accessed the parameters, either type “C” or type “F”, proceed as follows.

1. Press  or  until the parameter to be modified is reached, when scrolling through an icon appears on the display indicating the category the parameters belong to.

2. Alternatively, press  to display a menu that is used to quickly access the group of parameters to be modified.

3. Scroll through the menu using the  or  buttons, the display shows the codes of the various categories of the parameters, accompanied by the display of the corresponding icon (if present).

4. Once having reached the desired category, press  to move directly to the first parameter in the category.
(If there are no visible parameters in the selected category pressing  will have no effect.)

5. At this point continue to scroll through the parameters until reaching the parameter to be modified, or return to the “Categories” menu by pressing  for one second.

6. Press  to display the associated value.

7. Increase or decrease the value by pressing  or  buttons respectively, until the desired value has been reached.

8. By pressing  this will temporarily save the new value and return to displaying the parameter code.

9. Repeat the operations point 1 or point 2.

10. If the parameter has sub-parameters, press  to display the first sub-parameter.

11. Press  or  to display all of the sub-parameters.

12. Press  to display the associated value.

13. Increase or decrease the value by pressing  or  buttons respectively, until the desired value has been reached.

14. By pressing  this will temporarily save the new value and return to displaying the sub-parameter code.

15. Press  to return to displaying the parent parameter.

Procedure for setting the default parameter values

To set the default parameter setting proceed as follows.

1. Switch the instrument off.

2. Press and hold the  button

3. Whilst holding the  button switch the instrument on again until the message ”_std_” is shown on the display.

Note: the standard default values are set for parameters “C” and “F”, on completion it is necessary to change the respective parameters as detailed in the parameter settings table on page 6 and 7.

Classification of Parameters
The parameters, as well as being divided into type, are also grouped into logical categories identified by the initial letters or symbols of such parameters. The following table lists the categorise and the corresponding letters.

Parameter	Category	Text	Icon
/	Temperature probe parameters	'Pro'	
r	Temperature control parameters	'CtL'	
c	Compressor safety time and activation parameters	'CMP'	
d	Defrost parameters	'dEF'	
A	Alarm parameters	'ALM	
F	Fan parameters	'Fan'	
H Configuration	General configuration parameters (addresses, enabling, etc.…)	'CnF'	AUX
H HACCP	HACCP parameters	'HcP'	HACCP
RTC	RTC parameters	'rtc'	

Parameter Settings
The highlighted section indicate the Foster settings

No	Code	Parameter	Unit of Measure	Default	FHG2l	FHG3L
1	/2	Measurement stability	-	4	4	4
2	/3	Probe display reaction	-	0	0	0
3	/4	Virtual probe	-	0	0	0
4	/5	Select °C or °F	flag	0	0	0
5	/6	Decimal point	flag	0	0	0
6	/tI	Display on internal terminal	-	1	1	1
7	/tE	Display on external terminal	-	0	0	0
8	/P	Select type of probe	-	0	0	0
9	/A2	Configuration of probe 2	-	2	2	2
10	/A3	Configuration of probe 3	-	0	0	0
11	/A4	Configuration of probe 4	-	0	0	0
12	/C1	Calibration of probe 1	°C/°F	0.0	0.0	0.0
13	/C2	Calibration of probe 2	°C/°F	0.0	0.0	0.0
14	/C3	Calibration of probe 3	°C/°F	0.0	0.0	0.0
15	/C4	Calibration of probe 4	°C/°F	0.0	0.0	0.0
16	St	Temperature set point	°C/°F	0.0	0.0	0.0
17	rd	Controller differential	°C/°F	2.0	4.0	4.0
18	r1	Minimum SET allowed	°C/°F	-50	-26	-26
19	r2	Maximum SET allowed	°C/°F	60	-15	-15
20	r3	Operating mode	flag	0	0	0
21	r4	Automatic night time set point variation	°C/°F	3.0	3.0	3.0
22	r5	Enable temperature monitoring	flag	0	0	0
23	rt	Temperature monitoring interval	hours	-	-	-
24	rH	Maximum temperature read	°C/°F	-	-	-
25	rL	Minimum temperature read	°C/°F	-	-	-
26	c0	Compressor and fan start delay at start up	min	0	0	0
27	c1	Minimum time between successive starts	min	0	1	1
28	c2	Minimum compressor OFF time	min	0	0	0
29	c3	Minimum compressor ON time	min	0	0	0
30	c4	Duty Setting	min	0	80	80
31	cc	Continuous cycle duration	hours	0	0	0
32	c6	Alarm bypass after continuous cycle	hours	2	2	2
33	c7	Maximum pump down (PD) time	min	0	0	0
34	c8	Compressor start delay after opening PD valve	sec	5	5	5

35	c9	Enable autostart with PD operation	flag	0	0	0
36	c10	Select Pd by time or pressure	flag	0	0	0
37	c11	Delayed compressor delay	sec	4	4	4
38	d0	Type of defrost	flag	0	1	1
39	dI	Interval between defrosts	hours	8	6	6
40	dt1	End defrost temperature, evaporator.	°C/°F	4.0	20.0	20.0
41	dt2	End defrost temperature, aux. evaporator	°C/°F	4.0	4.0	4.0
42	dp1	Maximum defrost duration, evaporator	min	30	20	20
43	dp2	Maximum defrost duration, aux. Evaporator	min	30	30	30
44	d3	Defrost start delay	min	0	0	0
45	d4	Enable defrost at start up	flag	0	0	0
46	d5	Defrost delay at start up	min	0	0	0
47	d6	Display off during defrost	-	1	1	1
48	dd	Dripping time after defrost	min	2	1	1
49	d8	Bypass alarm after defrost	hours	1	1	1
50	d9	Defrost priority over compressor protection	flag	0	0	0
51	d/1	Display defrost probe	°C/°F	-	-	-
52	d/2	Display defrost probe	°C/°F	-	-	-
53	dC	Base time for defrost	flag	0	0	0
54	d10	Compressor running time	hours	0	0	0
55	d11	Running time temperature threshold	°C/°F	1.0	1.0	1.0
56	d12	Advanced defrost	-	0	0	0
57	dn	Nominal defrost time	-	65	65	65
58	dH	Proportional factor for variation in ‘dI’	-	50	50	50
59	A0	Alarm and fan differential	°C/°F	2.0	4.0	4.0
60	A1	Type of threshold for ‘AL’ and ‘AH’	flag	0	0	0
61	AL	Low temperature alarm threshold	°C/°F	0.0	0.0	0.0
62	AH	High temperature alarm threshold	°C/°F	0.0	0.0	0.0
63	Ad	Low and high temperature alarm delay	min	120	120	120
64	A4	Configuration of digital input 1	-	0	0	0
65	A5	Configuration of digital input 2	-	0	0	0
66	A6	Stop compressor from external alarm	min	0	0	0
67	A7	External alarm detection delay	min	0	0	0
68	A8	Enable alarms ‘Ed1’ and Ed2’	flag	0	0	0
69	Ado	Door switch light management mode	flag	0	0	0
70	Ac	High condenser temperature alarm	°C/°F	70.0	70.0	70.0
71	AE	High condenser alarm temperature differential	°C/°F	5.0	5.0	5.0
72	Acd	High condenser temperature alarm delay	min	0	0	0
73	AF	Off time with light sensor	sec	0	0	0
74	F0	Fan management	flag	0	0	0
75	F1	Fan start temperature	°C/°F	5.0	5.0	5.0
76	F2	Fan off with compressor off	flag	1	0	0
77	F3	Fans in defrost	flag	1	1	1
78	Fd	Fans off after dripping	min	1	1	1
79	H0	Serial address	-	1	30	30
80	H1	Function of relay 4	flag	1	2	2
81	H2	Disable key / infra red	flag	1	1	1
82	H3	Remote control enabling code	-	0	0	0
83	H4	Disable buzzer	flag	0	0	0
84	H5	Function of relay 5	-	3	3	3
85	H6	Lock out buttons	-	0	0	0
86	H7	Select PD by time or pressure	flag	0	0	0
87	HPr	Print profile	-	0	0	0

Note: The total number of parameters is 105. For ease of set up Foster only use the ones listed. The remaining are not used and adjustment is not recommended.

Parameter Definitions

/2 Measurement stability.
Defines the coefficient used to stabilise the temperature reading.

/3 Probe display rate
Sets the rate at which the temperature display is updated.

/4 Probe average (Virtual probe)
Used to choose whether to control the temperature based solely on the room probe reading, or alternatively whether to refer to the average of the room probe S1 and probe 2(S2, see parameter /A2).

/5 Select °C or °F
Defines the unit of measure in degrees centigrade or Fahrenheit.

/6 Decimal point
Used to enable or disable the displaying of the temperature with the resolution to the tenth of a degree between –20 and +20.

/tI Probe displayed by instrument
Select the probe to be displayed by the instrument.
Warning: Control is always based on the virtual control probe.

/tE Probe displayed on external terminal
Selects the probe to be displayed on the remote terminal.

/P Select type of probe
Used to select the type of probe for temperature measurement.
Default. /P = standard NTC probe with range –50 to +90°C.

/A2 Configuration of probe 2
Used to configure the operating mode of probe 2.
Default: /A2 =2 = Defrost probe.

/A3 Configuration of probe 3
Used to configure the operating mode of probe 3.
Default: /A3 = 0 = Probe 3 absent.

/A4 Configuration of probe 43
Used to configure the operating mode of probe 43.
Default: /A4 = 0 = Probe 4 absent.

/C1 Calibration or offset probe 1
/C2 Calibration or offset probe 2
/C3 Calibration or offset probe 3
/C4 Calibration or offset probe 4
These parameters are used to correct the temperature by the probes using an offset.
Example: To decrease the temperature measured by probe 1 by 2.3 degrees, set /C1 = -2.3.

St Set point
Establishes the controller set point.
Default: St = 0.0

rd Control delta
Establishes the value of the differential, or hysteresis, used to control the temperature.
Default: rd = 2.0. Foster setting: rd = 4.0

r1 Minimum allowed set point
Determine the set point minimum value.
Default: r1 = -50. Foster setting: r1 = -26.

r2 Maximum allowed set point.
Determine the set point maximum value.
Default: r2 = +60. Foster setting: r2= -15.

r3 **Operating mode**
The controller can work as a thermostat and defrost controller (r3 = 0), or as a simple thermostat in direct operation (r3 = 1), or as a simple thermostat in Reverse- cycle operation (r3 = 2).
Default setting: r3 = 0.

r4 **Automatic variation of the set point in night time operation.**
Default: 3.0. Not used by Foster

r5 **Enables minimum and maximum temperature monitoring.**
rt **Effective interval for monitoring the maximum and minimum temperature.**
rH **Maximum temperature measured in the interval rt.**
rL **Minimum temperature measured in the interval rt.**
These parameters are used for recording the temperature. Not used by Foster.

c0 **Compressor and fan start delay (if fan relay present) on start up.**
When the controller is switched on the compressor and evaporator fans start after a delay (in minutes) equal to the value set for this parameter.
Default: c0 = 0.

c1 **Minimum time between two successive starts of the compressor.**
Sets the minimum time (in minutes) that must elapse between two starts of the compressor irrespective of the temperature and the set point. Setting this parameter limits the number of starts per hour.
Default: c1 = 0. Foster setting c1 = 1.

c2 **Minimum compressor OFF time.**
Sets the minimum time (in minutes) that the compressor must remain OFF. The compressor is not started again until the minimum time selected (c2) has elapsed from when it last stopped.
Default: c2 = 0. No minimum OFF time is set.

c3 **Minimum compressor ON time.**
Sets the minimum running time for the compressor.
Default: c3 = 0. No minimum running time selected.

c4 **Duty setting**
If the virtual control probe fault alarm occurs (indicating a probe fault) the compressor unable to operate based on temperature will run on a timed bases equal to the value set in c4 with a fixed OFF time of 15 minutes.
Default: c4 = 0 minutes. Foster setting c4 = 80 minutes.

cc **Continuous cycle duration.**
The time (in hours) that the compressor operates continuously to lower the temperature, even below the set point
Default: cc = 0 = the continuous cycle is disabled.

c6 **Alarm bypass after continuous cycle.**
The time in hours that the temperature alarm is deactivated after a continuous cycle.
Default: c6 =2 hours.

c7 **Maximum pump down time.**
Not used by Foster.

c8 **Compressor start delay after opening PD valve.**
Not used by Foster.
Default: c8 = 5

c9 **Enable autostart function with PD operation.**
Not used by Foster
Default: c9 = 0

c10 **Select pump down by pressure or time.**
Not used by Foster
Default: c10 = 0

c11 **Delayed compressor delay**
Not used by Foster
Default: c11 = 4

d0 **Type of Defrost**
Sets the type of defrost required.
Default: d0 = 0. Foster setting d0 = 1. Hot gas defrost terminated by evaporator probe or in the event of probe failure by time (see dP1).

dI **Interval between defrosts.**
The defrosts are performed periodically at an interval equal to the value of 'dI' in hours.
The interval is cyclical and is maintained if the controller is turned OFF, when the controller is turned back ON a defrost will occur if the interval was exceeded.
Default: dI = 8. Foster setting dI = 6.

dt1 **End defrost temperature, evaporator probe.**
The evaporator probe termination temperature, in the event of a probe failure the defrost will be terminated by time (see dP1).
Default dt1 = 4.0. Foster setting dt1 = 20.0.

dt2 **End defrost temperature, auxiliary evaporator.**
Not used by Foster.
Default: dt2 = 4.0.

dP1 **Maximum defrost duration, Evaporator.**
Maximum time, in minutes, for defrost in the event of evaporator probe failure.
Default: dP1 = 30. Foster setting dP1 = 20.

dP2 **Maximum defrost duration, auxiliary evaporator.**
Not used by Foster
Default: dP2 = 30.

d3 **Defrost start delay**
Not used by Foster.
Default: d3 = 0.

d4 **Enable defrost at start up.**
Activates a defrost when the defrost is switched on.
0 = no defrost performed when the instrument is switched on
Default: d4 = 0.

d5 **Defrost delay at start up.**
Not used by Foster.
Default: d5 = 0.

d6 **Display during defrost.**
1 = The last temperature read prior to the start of the defrost remains on the display. The display returns to displaying the temperature when the set point is achieved.
Default: d6 = 1.

dd **Dripping time after defrost.**
The time, in minutes, that the evaporator fans are delayed after defrost to allow for the evaporator to drip.
Default: d6 = 2. Foster setting d6 = 1.

d8 **Bypass alarms after defrost.**
The time, in hours, that the high temperature alarms is disabled for after the end of the defrost cycle
Default: d8 = 1.

d9 **Defrost priority over compressor protection.**
Not used by Foster
Default: d9 = 0

d/1 **Display defrost probe.**
Displays the value measured by the defrost probe.

Once d/1 has been selected press the  button to display the temperature measured by the defrost probe.

d/2 **Display defrost probe 2 reading.**
Not used by Foster.

dC **Base time for defrost.**
Not used by Foster
Default: dC = 0.

d10 **Compressor running time.**
Not used by Foster
Default: d10 = 0.

d11 **Running time temperature threshold.**
Not used by Foster
Default: d11 = 1.0.

d12 **Advanced defrost.**
Not used by Foster
Default: d12 = 0.

dn **Nominal defrost time.**
Indicates the average duration of the defrost in normal operating conditions expressed as a percentage in accordance with dP1.
Default: dn = 65. Example dn at 65% of dP1 20 minutes = 13 minutes nominal defrost duration.

dH **Proportional factor for variation in 'dl'.**
Default: dH = 50.

A0 **Alarm and fan differential.**
Default: A0 = 2.0. Foster setting A0 = 4.0.

A1 **Type of threshold for 'AL' and 'AH'.**
Used to select if the values of parameters 'AL and 'AH' are absolute threshold or relative to the value of the set point.
Default: A1 = 0 = 'AL' and 'AH' are relative thresholds.

AL **Low temperature alarm threshold**.
Not used by Foster.
Default: AL = 0 = alarm disabled.

AH **High temperature alarm threshold**.
Not used by Foster.
Default: AH = 0 = alarm disabled.

Ad **Low and high temperature alarm delay.**
Indicates the time in minutes that the alarm from when the alarm was signalled.
Default: Ad = 120.

A4 **Configuration of digital input 1.**
Not used by foster.
Default: A4 = 0.

A5 **Configuration of digital input 2.**
Not used by foster.
Default: A5 = 0.

A6 **Stop compressor from external alarm.**
Not used by Foster

Default: A6 = 0.

A7 **External alarm detection delay.**
Not used by foster
Default: A7 = 0.

A8 **Enables alarm 'Ed1' and 'Ed2'.**
Not used by Foster.
Default: A8 = 0 = alarms 'Ed1' and 'Ed2' disabled.

Ado **Door switch light management mode.**
Not used by Foster.
Default: Ado = 0.

Ac **High condenser temperature alarm.**
Not used by Foster.
Default: Ac = 70.0.

AE **High condenser alarm temperature differential.**
Not used by Foster.
Default: AE = 5.0.

Acd **High Condenser temperature alarm delay.**
Not used by Foster.
Default: Acd = 0.

AF **Off time with light sensor.**
Not used by Foster.
Default: AF = 0.

F0 **Fan management.**
F0 = Fan runs all of the time, for fans during defrost see 'F3'.
Default: F0 = 0.

F1 **Fan start temperature.**
Used in conjunction with 'F0' when 'F0' = 1.
Default: F0 = 5.0. Fans remain ON while the evaporator is 5 degrees colder than the room temperature.

F2 **Fans off with compressor off.**
Used in conjunction with 'F0'.
Default: F2 = 1. Foster setting F2 = 0 fans are always ON (F0 =0).

F3 **Fans in defrost.**
Used to determine if the fans operate or not during defrost.
Default: F3 = 1. Fans do not operate during defrost.

Fd **Fans off after dripping.**
Fans can be stopped for a further period, in minutes, after defrost beyond what has been set in 'dd'.
Default: Fd = 1 = 1 additional minute dripping time.

H0 **Serial address.**
Used to assign an address to the instrument so that it responds to when connected to a supervisory or telemaintenance system.
Default: H0 = 1. Foster setting H0 = 30.

H1 **Function of relay 4.**
Auxiliary output used to power the doorframe lighting and frame heater.
Default: H1 = 1. Foster setting H1 = 2.

H2 **Disable keypad / infra red.**
Can be used to inhibit some functions relating to the use of the keypad.
Default: H2 = 1 = all enabled.

H3 **Remote control enabling code.**
Assigns an access code to the remote control if fitted.
Not used by Foster.

Default: H3 = 0.

H4 **Disable buzzer.**
H4 = 0 buzzer enabled. H4 = 1 buzzer disabled.
Default: H4 = 0.

H5 **Function of relay 5**.
Not used by Foster.
Default: H5 = 3.

H6 **Lock out Buttons.**
Not used by Foster.
Default: H6 = 0.

H7 **Select Keypad.**
Used to select the type of keypad on the controller.
Default: H7 = 0. Use the standard controller.

HPr **Print Profile.**
Not used by Foster.
Default: HPr = 0 = printing report disabled.

Note: Although there are further parameters in the controller these are not used by Foster and should be left with the standard default settings.

Spare Parts List

Item	Description	Part Number	FHG2L	FHG3L
Compressor	Scroll Compressor FL200DL 400/3/50 Used up to August 2004	00-555449	X	
Compressor	Scroll Compressor DS183651 230/1/50 Used from August 2004	00-555450	X	
Compressor	Scroll Compressor FL300DL 400/3/50	00-555451		X
Condenser coil	Condenser Set LUVE STVF370	00-555448	X	
Cond Fan Motor	MOTOR 11W/S	16240058	X	
Cond Fan Blade	Blade 254-26-5A	16240059	X	
Cond Fan Shroud	SHROUD CF-27	16240060	X	
Condenser coil	Condenser Coil BC6013/115	00-555474		X
Condenser Fan Motor	5136 Grid Mount 16W	15470027		X
Drier	DML 053S	00-555389	X	X
Liquid Receiver	VLR 122637 3/8 Sweat	15482010	X	X
HP Switch	Set at 28 BAR	00-555386	X	X
LP Switch	Set at 4PSI	00-555387	X	X
Sight Glass	3/8" SGN-105	15483015	X	X
Solenoid Valve	EVR6 32F1212	15451215	X	X
Vaporiser Tray Heater	Copper Coil	TBA		
Vaporiser Tray	Container White Part 758 140 81 Fish	00-554948	X	X
Defrost Klixon	Thermal Cutout 1/2" Autoreset	15243602	X	X
Defrost Heaters	Heater Rod PGC 94 (2 off per coil)	15843181	X	X
Evaporator Coil	BC6013/114 FHG2L	00-555475	X	
Evaporator Coil	BC6013/114 FHG3L	00-555476		X
Fan Motor	5133 Ring 10W 200mm	00-599687	X	X
Expansion Valve Body	TES2-NL68Z34300/68	15450386	X	X
Expansion Valve	Valve Exp Solder Adaptor 68-2	15450910	X	X
Orifice	NO 03 68-209300/68-20	15451105		X
Orifice	NO 02 68-2092/68-2072	15451104	X	
Control Panel	FHG2L Three Phase Complete	01-233868-01	X	
Control Panel	FHG2L Single Phase Complete	01-233867-01	X	
Control Panel	FHG3L Three Phase Complete	01-233869-01		X
Controller	Carel PB00F0HA10	16240051	X	X
Interface	RS 482 IROPZ48500	16240053	X	X
Probes	NTC 030WP00 IP68 3 metre	16240052	X	X
Isolator	KG10BT214/04E 20AMP 4 pole	16240211	X	X
16 AMP Contactor	KN S1010-C240- 300	15841105		X
R1/ R2 Relay	Omron G7L-1A-T 30Amp 1 Pole	15490420	X	X

MCB	Siemens 5SY6316 –8 TP 16 Amp 3 Pole	16240209	**X**	**X**

Wiring diagrams

The drawings numbers for the display cases are as follows:

FHG2L - 2 door unit single phase	00-233867-02
FHG2L - 2 door unit three phase	00-233868-02
FHG3L - 3 door unit three phase	00-233869-02

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