By Appointment to
Her Majesty Queen Elizabeth II
Suppliers of Commercial Refrigeration
Foster Refrigerator, King's Lynn

SLIMLINE FSL400 & FSL800

Including both Pre & Post February 2019 models

BIT25 Controller & LCD5S Display

Original Service Manual

English

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English

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Service Manual Information:

The products and all information in this manual are subject to change without prior notice.
We assume by the information given that the person(s) working on these refrigeration units are fully trained and skilled in all aspects of their workings. Also that they will use the appropriate safety equipment and take or meet precautions where required.
The service manual does not cover information on every variation of this unit; neither does it cover the installation or every possible operating or maintenance instruction for the units.

Health &Safety Warnings & Information	
	Make sure the power supply is turned off before making any electrical repairs.
	To minimise shock and fire hazards, please do not plug or unplug the unit with wet hands
	During maintenance and cleaning, please unplug the unit where required.
	Care must be taken when handling or working on the unit as sharp edges may cause personal injury, we recommend the wearing of suitable PPE.
	Ensure the correct moving and lifting procedures are used when relocating a unit.
	Do NOT use abrasive cleaning products, only those that are recommended. Never scour any parts of the refrigerator. Scouring pads or chemicals may cause damage by scratching or dulling polished surface finishes.
	Failure to keep the condenser clean may cause premature failure of the motor/compressor which will NOT be covered under warranty policy.
	Do NOT touch the cold surfaces in the freezer compartment. Particularly when hands are damp or wet, skin may adhere to these extremely cold surfaces and cause frostbite.
	Please ensure the appropriate use of safety aids or Personnel Protective Equipment (PPE) are used for you own safety.

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 client's 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, and 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 2079 Handling Refrigerants qualification or equivalent qualification.

8. Ensure all liquid substances are securely stored to prevent leaks and spill, and are not disposed of into storm drains, foul drain, or 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.

General Electrical Safety

Foster Refrigerator recommends that the equipment is electrically connected via a Residual Current Device; such as a Residual Current Circuit Breaker (RCCB) type socket, or through a Residual Current Circuit Breaker with Overload Protection (RCBO) supplied circuit.

Slimline Cabinet Range Description

The cabinets are manufactured as a one piece foamed shell with the condensing unit located on the base of the cabinet. All the cabinets conform to ISO Climate Class 5 (400c with 40% RH) with the temperature being controlled by a microprocessor with digital temperature display.
The refrigeration system is integral with an air-cooled condensing unit with the refrigerant being distributed into the evaporator controlled by capillary. This cooled air is circulated through the evaporator, via a fan in the storage area. To evaporate condensation, the plastic vaporiser tray has a hot gas line that is inserted into it.
The FSL400H & 800H have a temperature range of +10c to +40c with a timed off cycle defrost.
The FSL400L & 800L are different in that they have a temperature range of-180c to-210c with electric defrost set at 4 times per 24 hours.
The FSL400M & 800 are models designed for meat chilling and have a temperature range of-20c to +20c using R134a refrigerant.
The coding 'FSL' means Foster Slimline with the 400/800 afterwards being the respective net capacity in litres.
If the model comes with an H or L this denotes High or Low temperature units as with a G meaning it has glass doors and M denoting meat.
Both glass and solid doors are fitted with pivot hinges and also both have magnetic door gaskets. Only the solid doors have recessed door handles whereas the glass is surface mounted.
On the glass door models the interior light, incorporating the on/off switch, is fitted to the top of the storage area at the front of the unit. All models fitted with lockable swivel castors to the front and swivel castors to the rear.

Controller Relavance Table

Model	1st Serial Number Issued	Manufacturer Date From
400	E5270966	09/08/2010
800	E5270970	09/08/2010

Controller Operation

FSL400
Probe Air 2.5M SN4K15H1 (00-556248)
Probe Evap 2.5M SN4K15H2 (00-556251)

FD2-10 Controller (00-556241)
LCD 5S Display (00-555992)

FSL800
Probe Air 4M SN4B40H1 (00-556289)
Probe Evap 4M SN4B40H2B (00-556290)

LCD5 Connecting Ribbon 3m (00-555814)
(Normally only used on FSL800 Models

New FSL Models February 2019

Model	1st Serial Number Issued	Manufacturer Date From
400	E5	18/02/2019
800	E5	18/02/2019

FSL400
Probe Air 2.5M SN4B40H1 (00-556289)
Probe Evap 2.5M SN4B40H2B (00-556290)

FD2-10 Controller (00-556302)
LCD 5S Display (00-555992)

FSL800
Probe Air 4M SN4B40H1 (00-556289)
Probe Evap 4M SN4B40H2B (00-556290)

LCD5 Connecting Ribbon 3m (00-555814)
(Normally only used on FSL800 Models

LCD5S Display Icons and Buttons

Indicators and Buttons

Symbol	Reason	Button	Use
	Alarm	i set	Info/ Set Point Button
	Thermostat Output		Manual Defrost/ Decrease Button
	Fan Output		Increase Button/Manual Activation
	Defrost Output		Standby Button
	Activation of 2nd Parameter Set		

Display & Information Icons

During normal operation, the display shows either the temperature measured or one of the following indications:

Symbol	Reason	Button	Use
dEF	Defrost In Progress	hP	Condenser high pressure alarm
oFF	Controller in Standby	h i	High Temperature Alarm
cL	Condenser clean warning	Lo	Low Temperature Alarm
do	Door open alarm	E 1	Probe T1 Failure
hc	Condenser high temperature alarm	E2	Probe T2 Failure
t 1	Instant probe 1 temperature	tLo	Minimum probe 1 temperature recorded
t2	Instant probe 2 temperature*	cnd	Compressor working weeks **
t3	Instant probe 3 temperature*	Loc	Keypad state lock
thi	Maximum probe 1 temperature recorded		

** Displayed only if enabled (see configuration parameters)*
*** Displayed only if ACC> 0*

User Functions

Start Sequence

For normal operation

- Press and hold the button for 3 seconds then release.

The current cabinet temperature will be displayed.
If pressed and held for 5 seconds then released this will start the 'Test Sequence' tSt.

The test function is a defined sequence of events that will follow a prescribed pattern (dependent upon parameter values) that will operate all electrical elements of the system, simulating a short operating pattern. It should enable an engineer to carryout basic function operations checks of all system parts including refrigeration.
This sequence can take, and the display will count up to, a maximum of 935 seconds before showing 'End'. The length of time the test is run will be dependent on the model type and conditions the unit is placed in. After showing 'End' the controller will wait for 1 min, then resume normal operation and show the current temperature of the unit.
To cancel the test sequence prior to completion, press and release

Standby

When pressing the ⏻ button for 3 seconds, the unit will enter the standby mode and display oFF (unless already in standby and then this will energise the controller to show the current unit temperature).
This 'oFF' indication will be displayed while the unit is not operating but the mains power is applied to the unit. This mode may be used for interval cleaning regimes and short periods when the unit is not required. For extended periods of inactivity the mains supply should be isolated.

Access the menu and information

> Press and immediately release the i button.
> Using the ◀◀ and or ▶▶ II° buttons select the data you wish to display
> Press the i button to display the current value.
> To exit press the ⏻ button or wait 10 seconds.

To reset the THI and TLO:

> Use the ◀◀ and or ▶▶ II° buttons to select the data to be reset
> Display the value with the i button
> While keeping the i button pressed, press the ⏻ button to reset.

Set Point and Display Modification

> Press button i and hold for half a second.
> By keeping button i pressed, use ◀◀ and or ▶▶ II° buttons to set the desired value (adjustment is within the minimum SPL and the maximum SPH limit)
> When button i is released, the new value is stored.

Keypad Security Settings

The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controller is operating in a public place.
Press briefly 'i set' then use either '◀◀' or '▶▶ II°' to select 'Loc'. While holding 'i set' use either '◀◀' or '▶▶ II°' to change from a 'YES' to 'no'. Leave for 10 seconds or briefly press '⏻' to resume.

Defrost

Automatic Defrost

Defrost starts automatically as soon as the time set with parameter DFT has elapsed.

> **Time Defrost** With DFM = TIM defrost takes place at regular intervals when the timer reaches the value DFT. For example, with DFM = TIM and DFT = 06, a defrost will take place every 6 hours.
> **Defrost time count backup** At power restoration, if DFB = YES, the defrost timer resumes the time count from where it was prior to the power interruption. If DFB=NO, the time count re-starts from 0. In stand-by the accumulated time count is frozen.

Defrost Type – When defrost has started, compressor and defrost outputs are controlled according to the parameter DTY.
If FID = YES, the evaporator fans are active during defrost.

Resuming Thermostatic Cycle

When defrost is complete, if DRN is greater than 0, all outputs will remain off for the DRN minutes.

Manual Defrost

To initiate a manual defrost press and hold the defrost button ◀◀ for 2 seconds.

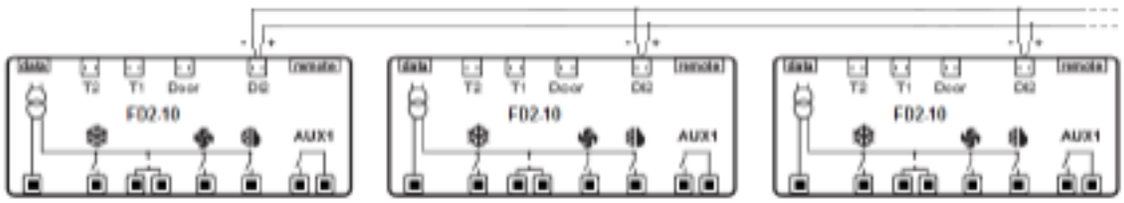
Fuzzy Logic

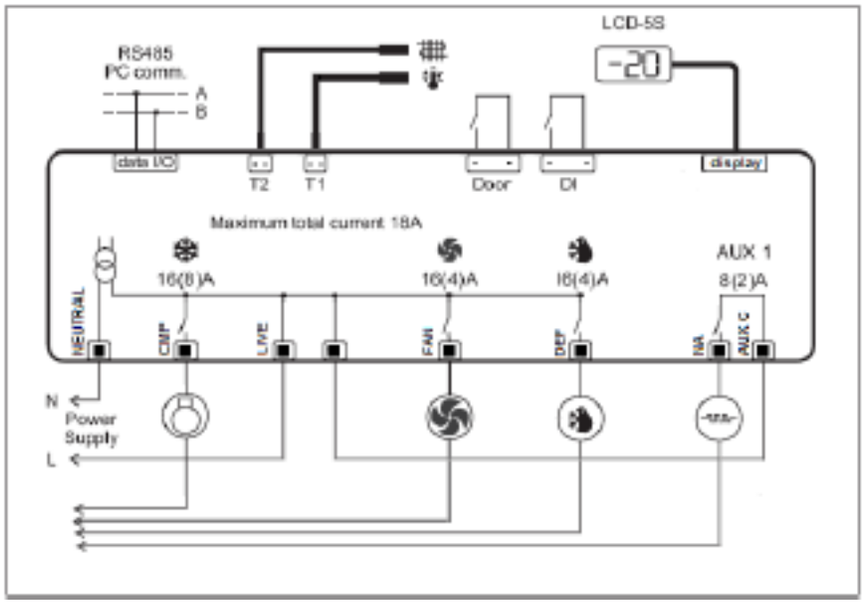
'**Fuzzy Logic**' is an energy saving feature which enables the refrigeration system performance on specific models to be automatically adjusted during operation, for optimum energy performance whilst maintaining the correct internal storage temperature. When enabled it works by identifying periods of high and low usage and applying an appropriate temperature set point and defrost frequency. Additionally the evaporator fan(s) can be caused to cycle (providing 'air stir' only) in low usage periods.

'**Fuzzy Logic**' operation is controlled by parameter '**IISM**'. Setting the value '**HDD**' for this parameter will cause the controller to automatically change between the 'economy' and 'performance' operating modes (the actual switching point sensitivity is controlled by parameter '**HDS**'). Setting '**IISM**' to '**non**' will disable the '**Fuzzy Logic**' function.

When enabled, and upon the product being switched 'On', 'Fuzzy Logic' will automatically start using the 'economy' settings to control the operation of the temperature and defrost ('**SP**', '**HYS'**, and '**DFT**'). The controller will remain operating to the values of these settings unless; through monitoring of the air temperature, evaporator temperature and door switch (where T2 probe and door switch are fitted), the controller determines that the usage frequency or temperature variation indicates more demanding operational conditions. In such circumstances the controller will switch to the 'performance' mode (utilising parameters '**IISP**', '**IIHY**' and '**IIDF**'). Upon usage or temperature variation reducing sufficiently the controller will revert back to the 'economy mode'. The evaporator fan operation works in conjunction with, but separate from '**Fuzzy Logic**'. Determined by parameter '**FCM**', and normally set to '**TIM**', the fans will run continuously when the compressor is on, subject to the door switch operation (where fitted). During the compressor off cycle the fans will operate in an 'air stir' mode (controlled by parameters '**FT1**', '**FT2**' and '**FT3**'). Where '**FCM**' is set to 'non' the fans will run continuously. The fan cycle mode during the 'performance' operation of '**Fuzzy Logic**' is controlled by parameter '**IIFC**'.

Parameter Setting Wiring Diagram for Synchronising Defrost Start and Termination





FD2-10 Technical Data

Power Supply
230Vac±10%, 50/60Hz, 3W

Relay Output Max Load (230Vac)
Compressor – 16(8) A 240Vac
Defrost - 16(4) A 240Vac
Evap. Fan - 16(4) A 240Vac
Auxiliary Loads 1 - 8(2) A 240Vac

Input – NTC 10KΩ @ 25°C

Measurement Range
-50…120°C, -55…240°F
-50 / -9.9…19.9 / 80°C (NTC 10K Only)

Measurement Accuracy
<0.5°C within the measurement range
Operating Conditions
-10 … +50°C; 15% … 80% r.H

Controller Approvals
EN60730-1; EN60730-2-9
EN55022 (Class B)
EN50082-1

Configuration of Parameters

Parameters should not be changed unless you have an understanding of their purpose and the following instructions are fully understood.

> To gain access to the parameters access the configuration menu by pressing ⏻ + i set together for 5 seconds.
> The first parameter will show on the display.
> Using the ◀◀ and or ▶▶ II° buttons select the required parameter.
> Press the i button to display its current value.
> While keeping i set pressed, use the ◀◀ and or ▶▶ II° buttons to set the new desired value.
> On releasing i the new value will be stored and the next parameter will display.
> To exit this mode or revert to normal operating mode, press ⏻ or wait for 30 seconds.

If at any point no buttons are pressed for 30 seconds, without saving a new value, the display will return to the standard temperature display.

FD2-10 Controller Default Parameter Values & Descriptions

Parameter	Range	Decription	Foster FD2-10
SCL		Readout Scale:	2°C
	1°C	Range-50/-9.9 …. 19.9/80oC (with INP = SN4 only)	
	2°C	Range-5° …. 120°C	
	°F	Range-55 …. 240°F	
SPL	-50 … SPH	Minimum limit for SP setting.	1
SPH	SPL … 120°	Maximum limit for SP setting.	3
SP	SPL … SPH	Temperature setpoint to be achieved.	2

C-H		Temperature control mode:	REF
	REF	Refrigeration.	
	HEA	Heating.	
HYS	1 … 10°	Off / On thermostat differential.	3
CRT	0 … 30 min	Compressor rest time.	2
CT1	0 … 30 min	Thermostat run time with faulty T1 probe.	6
		(CT1 = 0 output with faulty T1 will always be on).	
CT2	0 … 30 min	Thermostat run time with Faulty T1 probe.	4
		(CT2 = 0 & CT1 =>0 output with faulty T1 will always be on).	
CSD	0 … 30 min	Compressor stop delay after door has been opened.	1
		(Only if DS = YES).	
DFM		Defrost start mode:	TIM
	NON	Defrost function is disabled.	
	TIM	Regular time defrost.	
	FRO	Defrost time elapses only in condition of frost accumulation.	
DFT	0 … 99 hours	Time interval between defrosts.	6
DFB		Defrost timer clock.	YES
	YES	Following mains interruption, timer resumes count.	
	NO	Following mains interruption, timer restarts from zero.	
DLI	-50 … 120°	Defrost end temperature	N/A
		Only if T2 = EPO).	
DTO	1 … 120 min	Maximum defrost duration.	20
DTY		Defrost type:	OFF
	OFF	Timed off cycle defrost (compressor and heater off).	
	ELE	Electric heater defrost (compressor off, heater on).	
	GAS	Hot gas defrost (compressor and heater on).	
DPD	0 … 240 sec	Evaporator pump down. Timed pause at start of defrost.	0
DRN	0 … 30 min	Drain down period.	2
DDM		Defrost display mode:	DEF
	RT	Real (actual) air temperature.	
	LT	Last temperature display before start of defrost.	
	SP	The current setpoint value.	
	DEF	"DEF"	

DDY	0 ... 60 min	Defrost display delay period.	10
FID		Fans in defrost:	YES
	YES	Fans run during defrost.	
	NO	Fans do not run during defrost.	
FDD	-50 ... 120°	Evaporator fan restart temperature following defrost.	5
		(Only if T2 = EPO).	
FTO	0 ... 120 min	Maximum evaporator fan stop period following defrost.	3
FDS	0 ... 120 sec	Minimum evaporator fan stop (following door opening etc.).	20
FCM		Evaporator fan mode during thermostatic control:	TIM
	NON	Fan(s) run continuously.	
	TMP	Temperature based control. When compressor is on, fans are	
		on. When compressor is off, fans run as long as temperature	
		difference Te-Ta > FDT. Fans on again with FDH.	
	TIM	Time based control. When compressor is on, fans are on.	
		When compressor is off, fans in accordance to parameters	
		FT1, FT2 and FT3.	
FDT	-120 ... 0°	Te-Ta difference for fans to turn off after compressor stopped.	-1
		(Only if T2 = EPO and FCM = TMP).	
FDH	1 ... 120°	Temperature differential for evaporator fan restart.	3
		(Only if T2 = EPO and FCM = TMP).	
FT1	0 ... 180 sec	Fan stop delay after compressor stop.	15
FT2	0 ... 30 min	Timed fan stop following FT1.	3
		(With FT2 = 0 the fans remain on all the time).	
FT3	0 ... 30 min	Timed fan run following FT2.	2
		(With FT3 = 0 & FT2 > 0 the fans remain off all the time).	
ATM		Alarm threshold configuration:	REL
	NON	All temperature alarms are inhibited.	
	ABS	The value set in ALA & AHA represent actual alarm setpoints.	
	REL	The values set in ALR & AHR are alarm differentials which relate to SP and SP + HYS.	
ALA	-50 ... 120o	Low temperature alarm threshold.	
AHA	-50 ... 120o	High temperature alarm threshold.	

ALR	-12 ... 0°	Low temperature alarm differential. (With ALR = 0 the low temperature alarm is excluded).	-5
AHR	0 ... 12°	High temperature alarm differential. (With AHR = 0 the low temperature alarm is excluded).	5
ATI		Alarm probe:	T1
	T1	Air temperature probe used for alarm detection.	
	T2	Evaporator temperature probe used for alarm detection.	
ATD	0 ... 120 min	Delay before alarm temperature warning.	90
ADO	0 ... 30 min	Delay before door open alarm warning.	8
AHM		Operation in case of high condenser alarm (T2 = CND):	NON
	NON	High condenser temperature alarm inhibited.	
	ALR	Condenser warning- 'HC' displayed, alarm sounds.	
	STP	As 'ALR' with compressor stopped and defrosts suspended.	
AHT	-50 ... 120°	Condenser alarm temperature (T2 = CND).	65
ACC	0 ... 52 weeks	Condenser cleaning period. (With ACC = 0 condenser cleaning is disabled).	0
IISM		Switchover method to second parameter set:	HDD
	NON	Second parameter set is excluded.	
	MAN	Second parameter set is activated / deactivated by button 'M'.	
	HDD	Second parameter activated by 'heavy' usage.	
	DI2	Second parameter set activated by DI2 input (DI2 = IISM).	
IISL	-50 ... IISH	Minimum limit for IISP setting.	1
IISH	IISL ... 120°	Maximum limit for IISP setting.	1
IISP	IISP ... IISH	Temperature setpoint to be achieved in 'Mode 2'.	1
IIHY	1 ... 10°	Off / On thermostat differential in 'Mode 2'.	3
IIFC		Evaporator fan mode during 'Mode 2' thermostatic control:	NON
	NON	Fan(s) run continuously.	
	TMP	Temperature based control. When compressor is on, fans are	
		on. When compressor is off, fans run as long as temperature	
		difference Te-Ta > FDT. Fans on again with FDH.	
	TIM	Time based control. When compressor is on, fans are on.	
		When compressor is off, fans in accordance to parameters	
		FT1, FT2 and FT3.	

HDS	1 ... 5	Controller sensitivity for switch over between 'Modes' 1 and 2.	3
		(1 = minimum, 5 = maximum)	
IIDF	0 ... 99 hours	Time interval between defrosts in 'Mode 2'.	6
SB		Standby button operation:	YES
	YES	Standby button enabled.	
	NO	Standby button disabled.	
DS		Door switch operation (switch made when door closed):	YES
	YES	Door switch enabled.	
	NO	Door switch disabled.	
DI2		Configurable digital input operation:	NON
	NON	Digital input 2 not activated.	
	HPS	High pressure alarm when contact opens.	
	IISM	'Mode 2' parameters active when contact closes.	
	RDS	Defrost initiated when contact closes.	
	DS2	Second door switch function (operates 'in series' with DS).	
LSM		Light control mode:	NON
	NON	Light output is excluded.	
	MAN	Light output operation is activated / deactivated by button 'M'.	
		(With OA1 = LGT).	
	DOR	Light output is switched on when door is opened.	
		(With OA1 = LGT and DS = YES).	
	NDR	Light output is switched off when door is opened.	
		(With OA1 = LGT and DS = YES).	
OA1		Auxiliary relay operation:	NON
	NON	Output disabled (always off).	
	0-1	Contacts open / close with standby / on mode.	
	LGT	Output enabled for light control.	
	AL0	Contacts open when an alarm condition occurs.	
	AL1	Contacts close when an alarm condition occurs.	
		(Relay contacts open when in stand by mode).	
INP		Temperature sensor(s) type:	SN4
	SN4	10k NTC type thermistor (red writing)	
	ST1	1k PTC type thermistor (black writing)	
OS1	-12.5 ... 12.5°C	Air temperature probe (T1) offset.	0

T2		T2 probe function:	NON
	NON	T2 probe disabled.	
	EVP	Evaporator temperature monitoring.	
	CND	Condenser temperature monitoring.	
OS2	-12.5 … 12.5oC	T2 probe temperature offset.	0
TLD	1 … 30 min	Delay for min. (TLO) and max. (THI) temperature logging.	10
SIM	0 … 100	Display slowdown.	5
ADR	1…255	FD2-10 address for PC communication	1

Individual Unit Controller Parameter Values for Pre February 2019 Models

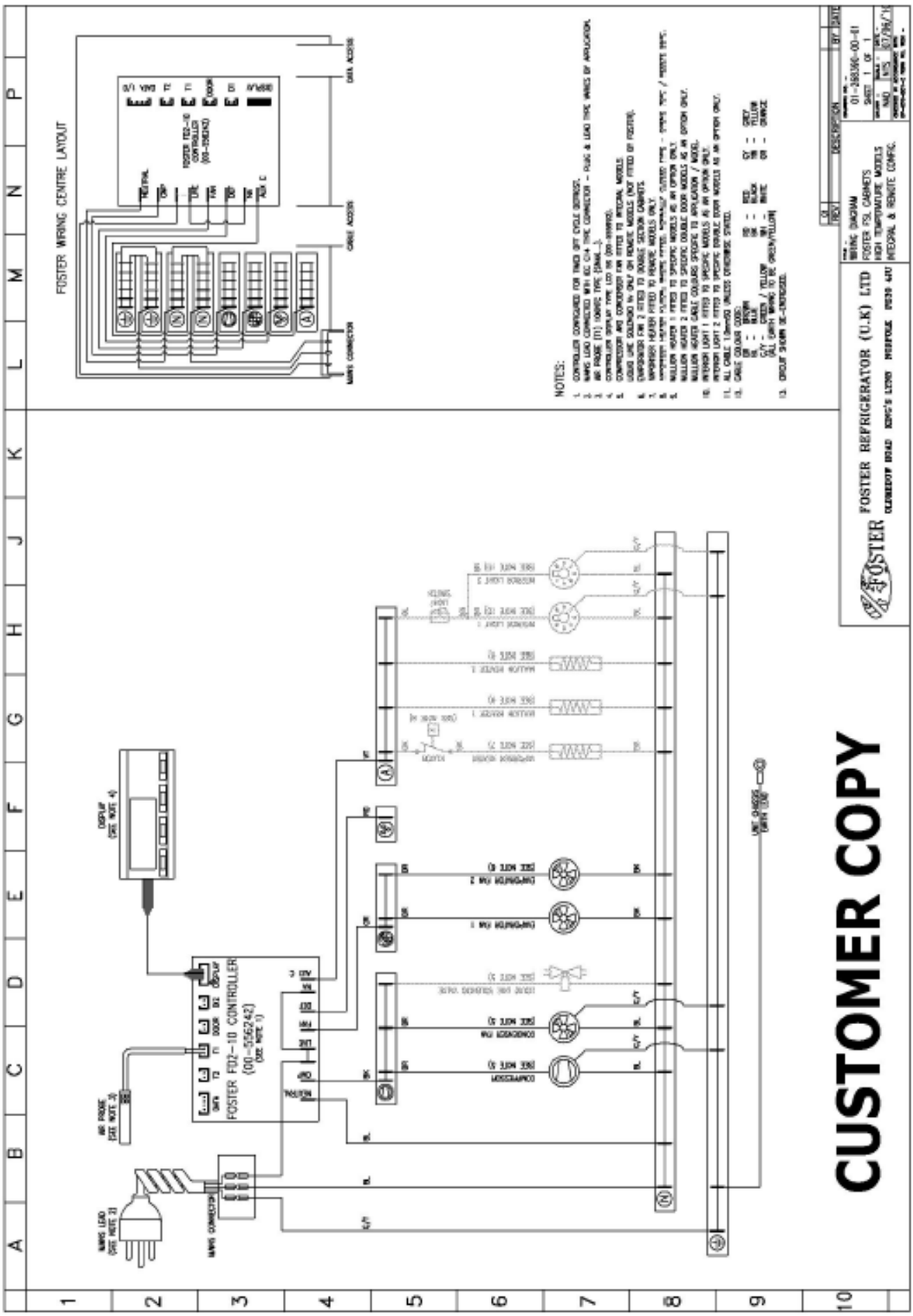
FOSTER FD2-10						FSL400H	FSL400L	FSL800H	FSL800L	FSL400M & FSL800M
Reg	Para	Min	Mid	Max	Description	C	I	C	I	O
253	SCL	1°C	°F	2°C	Readout scale.	2°C	2°C	2°C	2°C	2°C
200	SPL	-50°		SPH	Minimum limit for SP setting.	1	-21	1	-21	-2
202	SPH	SPL		120°	Maximum limit for SP setting.	3	-19	3	-19	0
204	SP	SPL		SPH	Temperature set point to be achieved.	1	-21	1	-21	-2
268.1	C-H	REF		HEA	Temperature control mode.	REF	REF	REF	REF	REF
214	HYS	1°		10°	Off/On thermostat differential.	4	4	4	4	2
216	CRT	0 min		30 min	Compressor rest time	2	2	2	2	2
217	CT1	0 min		30 min	Thermostat run time with faulty T1 probe	6	6	6	6	6
218	CT2	0 min		30 min	Thermostat off time with faulty T1 probe	4	4	4	4	4
219	CSD	0 min		30 min	Compressor stop delay after door has been opened. (Only if DS = YES).	1	1	1	1	1
220	DFM	NON	FRO	TIM	Defrost start mode.	TIM	TIM	TIM	TIM	TIM
221	DFT	0 hours		99 hours	Time interval between defrosts.	6	6	6	6	6
268.4	DFB	NO		YES	Defrost timer clock.	YES	YES	YES	YES	YES
206	DLI	-50°		120°	Defrost end temperature (Only if T2- EPO).	20	20	20	20	20
223	DTO	1 min		120 min	Maximum defrost duration.	20	20	20	20	20
224	DTY	OFF	ELE	GAS	Defrost Type.	OFF	ELE	OFF	ELE	ELE
225	DPD	0 sec		240 sec	Evaporator pump down. Timed pause at start of defrost.	0	0	0	0	0
226	DRN	0 min		30 min	Drain down period.	2	2	2	2	2
227	DDM	RT	SP, DEF	LT	Defrost display mode.	DEF	DEF	DEF	DEF	DEF
228	DDY	0 min		60 min	Defrost display delay period.	10	10	10	10	10
267.5	FID	NO		YES	Fans in defrost	YES	NO	YES	NO	NO
207	FDD	-50°		120°	Evaporator fan restart temperature following defrost. (Only if T2 = EPO).	5	0	5	0	0
229	FTO	0 min		120 min	Maximum evaporator fan stop period following defrost.	3	3	3	3	3

Reg	Para	Min	Mid	Max	Description	C	I	C	NI	O
237	FDS	0 sec		120 sec	Minimum evaporator fan stop (following door opening etc.).	20	20	20	20	20
230	FCM	NON	TIM	TMP	Evaporator fan mode during thermostatic control.	TIM	TIM	TIM	TIM	TIM
232	FDT	-120°		0°	Te-Ta difference for fans to turn off after compressor stopped. (Only if T2 = EPO and FCM = TMP).	-1	-1	-1	-1	-1
233	FDH	1°		120°	Temperature differential for evaporator fan restart. (Only if T2 = EPO and FCM = TMP).	3	3	3	3	3
234	FT1	0 sec		180 sec	Fan stop delay after compressor stop.	15	15	15	15	15
235	FT2	0 min		30 min	Timed fan stop following FT1. (With FT2 = 0 the fans remain on all the time).	0	0	0	0	0
236	FT3	0 min		30 min	Timed fan run following FT2. (With FT3 = 0 & FT2 > 0 the fans remain off all the time).	2	2	2	2	2
238	ATM	NON	REL	ABS	Alarm threshold configuration.	REL	REL	REL	REL	REL
208	ALA	-50°		120°	Low temperature alarm threshold.	-2	-2	-2	-2	-2
209	AHA	-50°		120°	High temperature alarm threshold.	8	8	8	8	8
239	ALR	-12°		0°	Low temperature alarm differential. (With ALR = 0 the low temperature alarm is excluded).	-5	-5	-5	-5	-5
240	AHR	0°		12°	High temperature alarm differential. (With AHR = 0 the low temperature alarm is excluded).	5	5	5	5	5
241	ATI	T1		T2	Alarm probe.	T1	T1	T1	T1	T1
242	ATD	0 min		120 min	Delay before alarm temperature warning.	90	90	90	90	90
243	ADO	0 min		30 min	Delay before door open alarm warning.	8	8	8	8	8
244	AHM	NON	STP	ALR	Operation in case of high condenser alarm (T2 = CND).	NON	NON	NON	NON	NON
210	AHT	-50°		120°	Condenser alarm temperature (T2 = CND).	65	65	65	65	65
245	ACC	0 weeks		52 weeks	Condenser cleaning period. (With ACC = 0 condenser cleaning is disabled).	0	0	0	0	0
247	IISM	NON	HDD, DI2	MAN	Switchover method to second parameter set.	HDD	HDD	HDD	HDD	HDD
201	IISL	-50°		IISH	Minimum limit for IISP setting.	1	-21	1	-21	-2
203	IISH	IISL		120°	Maximum limit for IISP setting.	1	-21	1	-21	0
205	IISP	IISL		IISH	Temperature setpoint to be achieved in ‘Mode 2’.	1	-21	1	-21	-2
215	IIHY	1°		10°	Off / On thermostat differential in ‘Mode 2’.	4	4	4	4	4
231	IIFC	NON	TIM	TMP	Evaporator fan mode during ‘Mode 2’ thermostatic control.	NON	NON	NON	NON	NON
246	HDS	1		5	Controller sensitivity for switch over between ‘Modes’ 1 and 2. (1 = minimum, 5 = maximum).	3	3	3	3	3
222	IIDF	0 hours		99 hours	Time interval between defrosts in ‘Mode 2’.	6	6	6	6	6
268.7	SB	NO		YES	Standby button operation.	YES	YES	YES	YES	YES
268.0	DS	NO		YES	Door switch operation (switch made when door closed).	NO	NO	NO	NO	NO
251	DI2	NON	IISM, RDS, DS2	HPS	Configurable digital input operation.	NON	NON	NON	NON	NON
248	LSM	NON	DOR, NDR	MAN	Light control mode.	NON	NON	NON	NON	NON

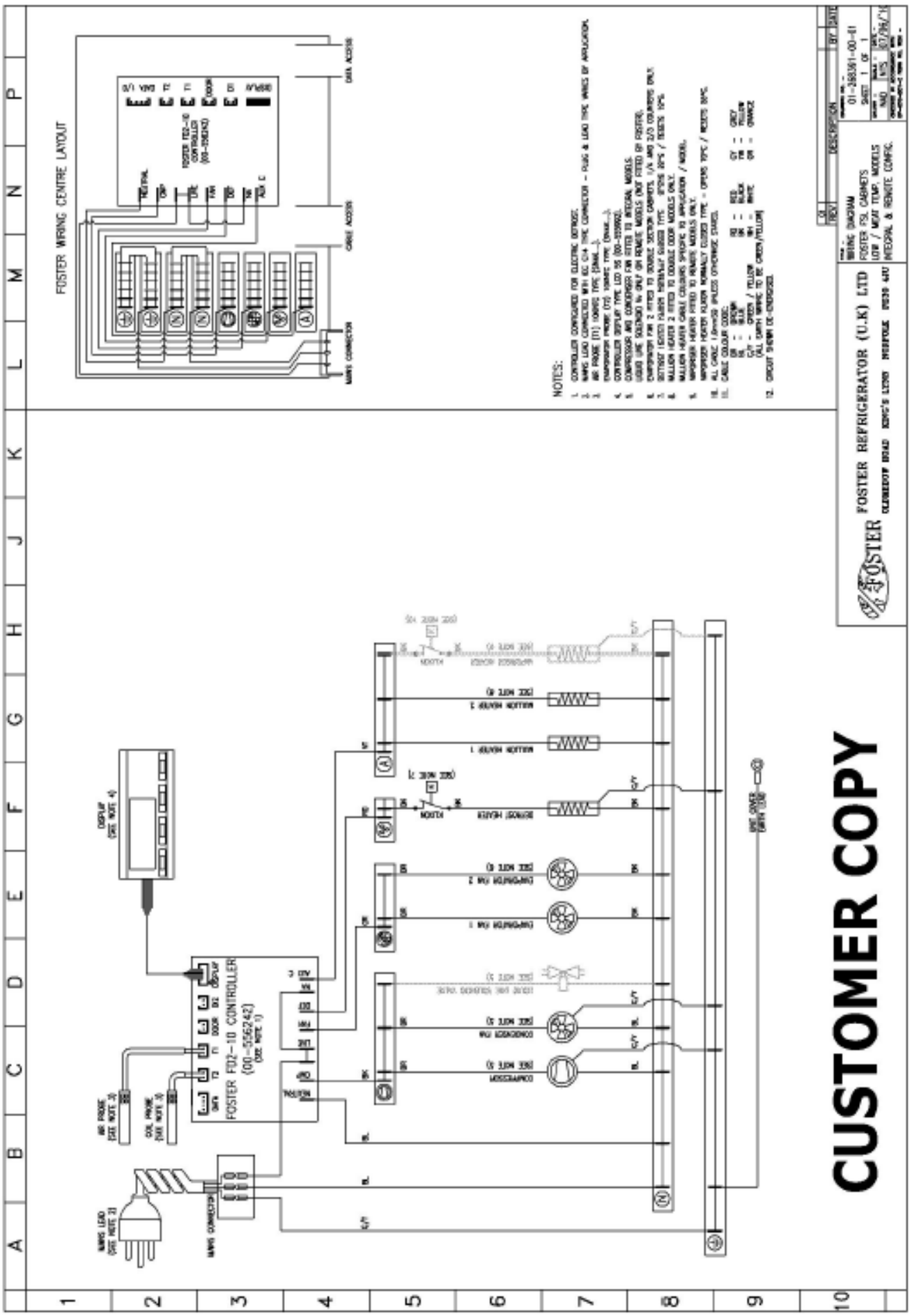
Reg	Para	Min	Mid	Max	Description	C	I	C	NI	O
249	OA1	NON	LGT, AL0, AL1	0-1	Auxiliary relay operation.	0-1	0-1	0-1	0-1	0-1
268.2	INP	ST1		SN4	Temperature sensor(s) type.	SN4	SN4	SN4	SN4	SN4
256	OS1	-12.5°C		12.50C	Air temperature probe (T1) offset.	0	0	0	0	0
250	T2	NON	EVP	CND	T2 probe function.	NON	EVP	NON	EVP	EVP
251	OS2	-12.5°C		¹².⁵⁰c	T2 probe temperature offset.	0	0	0	0	0
252	TLD	1 min		30 min	Delay for min. (TLO) and max. (THI) temperature logging.	10	10	10	10	10
254	SIM	0		100	Display slowdown.	5	5	5	5	5
255	ADR	1		255	FD2-10 address for PC communication	1	1	1	1	1

Parameters ALA and AHA will not be visible when ATM is set at REL.
Parameters ALR and AHR will not be visible if ATM is changed to ABS.

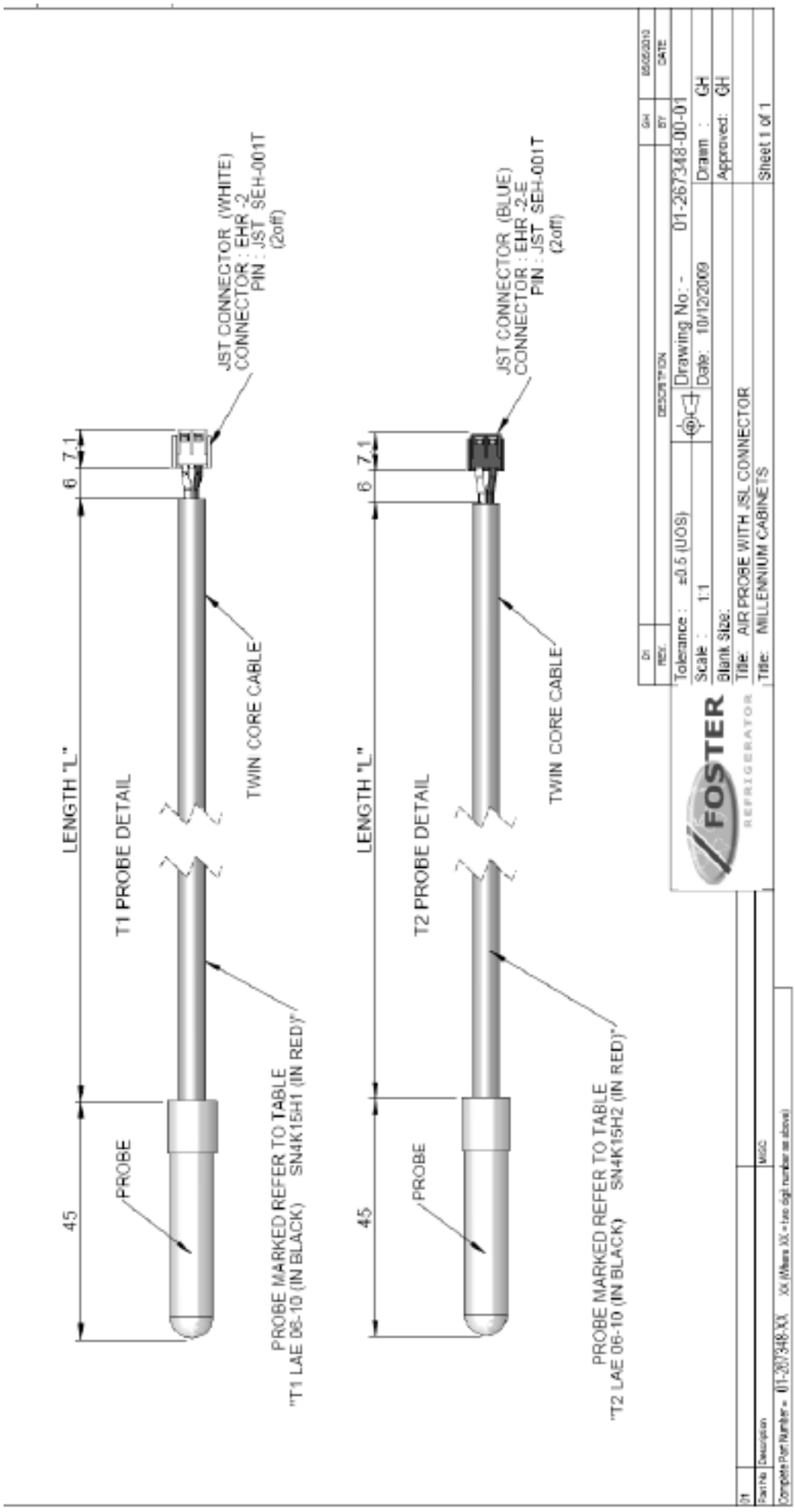
Slimline High Temp (Integeral and Remote Models) Wiring Diagram



Slimline Low/Meat Temp (Integeral and Remote Models) Wiring Diagram



Air and Evaporator Probe Details / Diagram



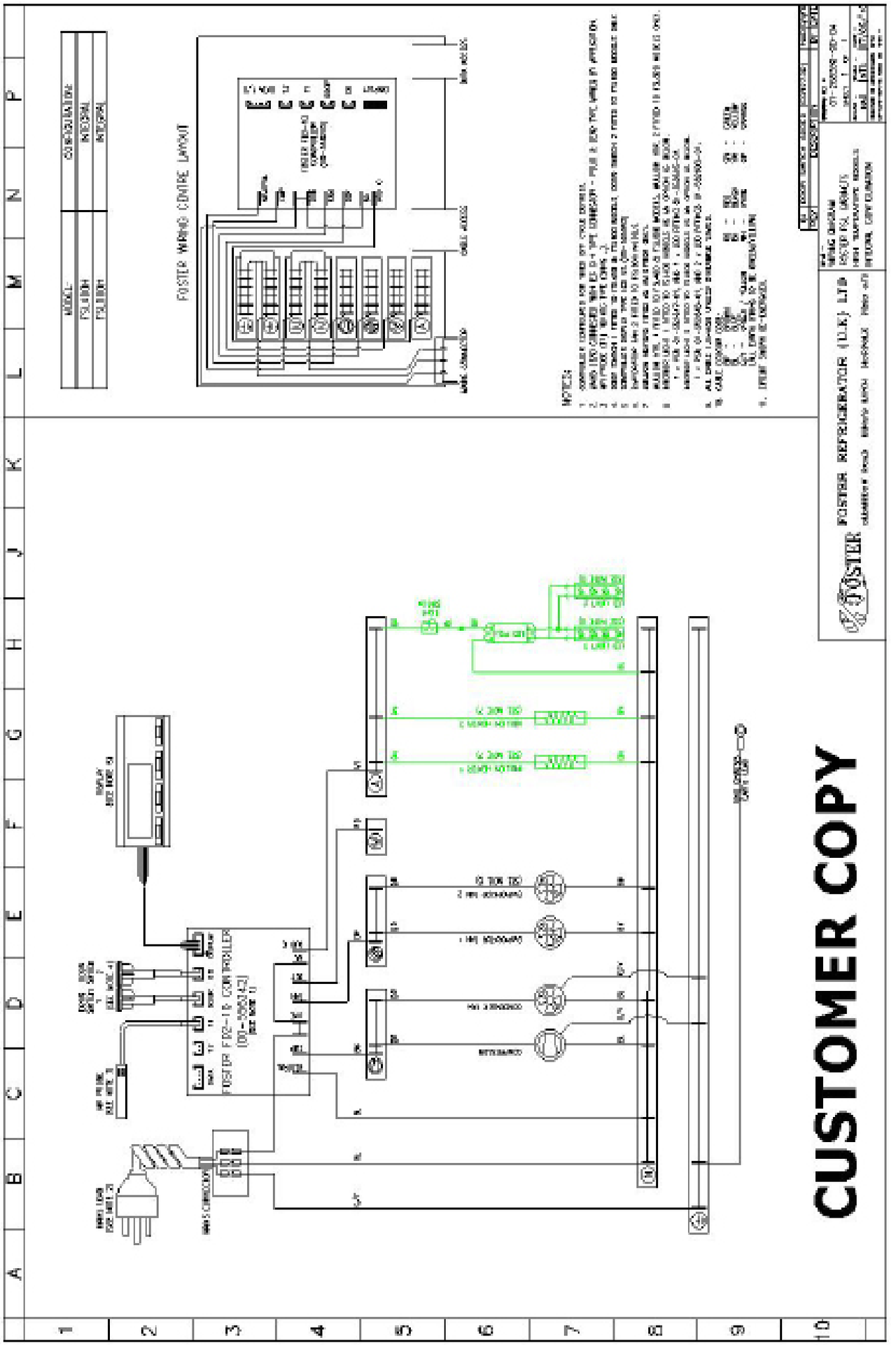
Probe Air 2.5M SN4K15H1 (00-556284)
Probe Evap 2.5M SN4K15H2 (00-55627)

Individual Unit Controller Parameter Values for Post February 2019 Models

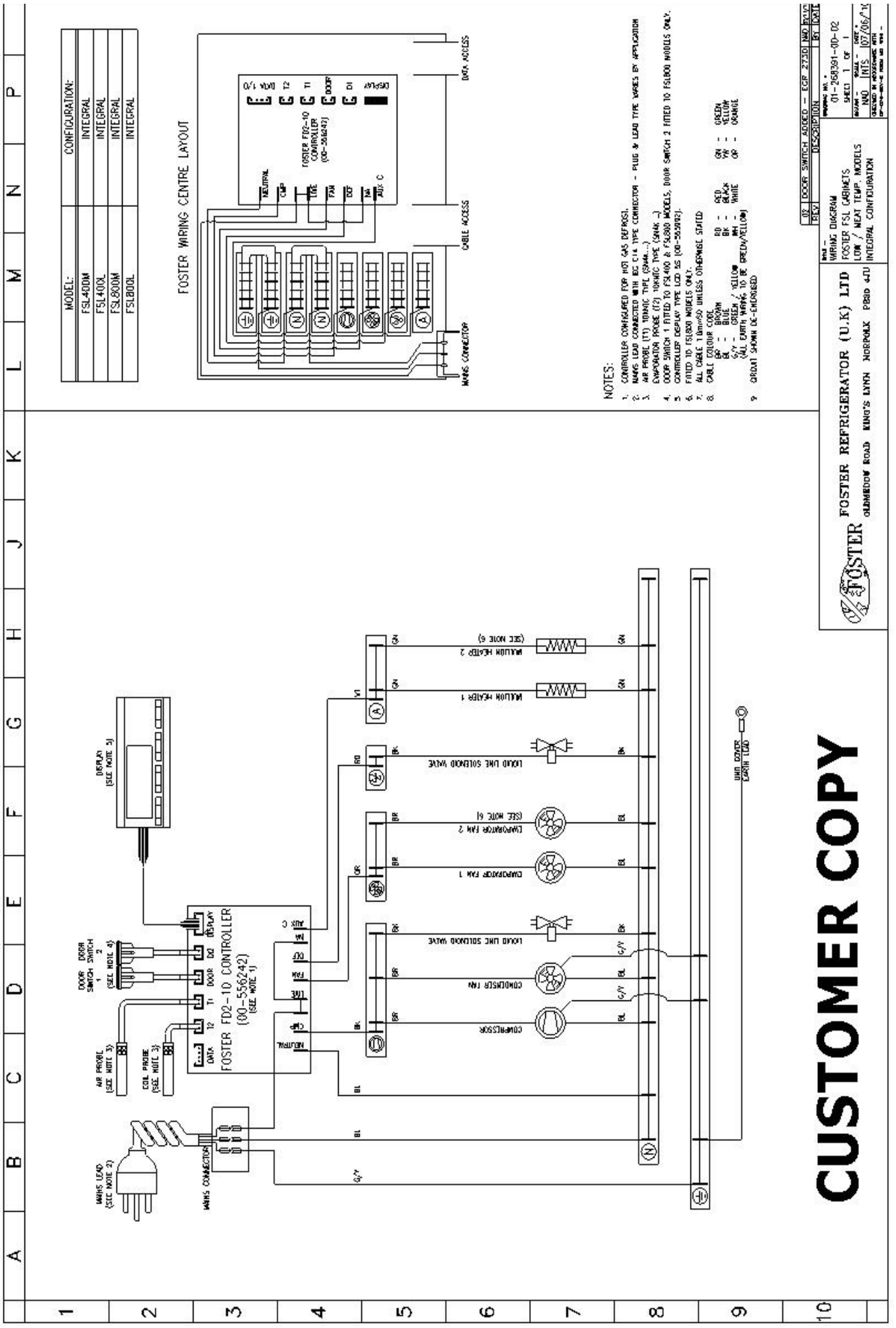
	FD2-10 Default	FSL400H	FSL400G	FLS400M	FSL400L	FSL800H	FSL800G	FSL800M	FSL800L
Parameter									
SCL	2°C	2°C	2°C	2°C	2°C	2°C	2°C	2°C	2°C
SPL	1	1	1	-2	-21	1	1	-2	-21
SPH	3	3	3	8	-19	3	3	8	-19
SP	1	1	1	-2	-21	1	1	-2	-21
C-H	REF	REF	REF	REF	REF	REF	REF	REF	REF
HYS	4	3	3	2	3	3	3	2	3
CRT	2	2	2	2	2	2	2	2	2
CT1	6	6	6	6	6	6	6	6	6
CT2	4	4	4	4	4	4	4	4	4
CSD	1	1	1	1	1	1	1	1	1
DFM	TIM	TIM	TIM	TIM	TIM	TIM	TIM	TIM	TIM
DFT	6	6	6	6	6	6	6	6	6
DFB	YES	YES	YES	YES	YES	YES	YES	YES	YES
DLI	20	20	20	20	20	20	20	20	20
DTO	20	20	20	20	20	20	20	20	20
DTY	OFF	OFF	OFF	GAS	GAS	OFF	OFF	GAS	GAS
DPD	0	0	0	0	0	0	0	0	0
DRN	2	2	2	2	2	2	2	2	2
DDM	DEF	DEF	DEF	DEF	DEF	DEF	DEF	DEF	DEF
DDY	10	10	10	10	10	10	10	10	10
FID	YES	YES	YES	NO	NO	YES	YES	NO	NO
FDD	5	5	5	0	0	5	5	0	0
FTO	3	2	3	3	3	2	3	3	3
FDS	20	20	20	20	20	20	20	20	20
FCM	TIM	TIM	TIM	TIM	TIM	TIM	TIM	TIM	TIM
FDT	-1	-1	-1	-1	-1	-1	-1	-1	-1
FDH	3	3	3	3	3	3	3	3	3
FT1	15	15	15	15	15	15	15	15	15
FT2	3	2	2	2	2	2	2	2	2
FT3	2	2	2	2	2	2	2	2	2
ATM	REL	REL	REL	REL	REL	REL	REL	REL	REL
Only visible with ATM = ABS	ALA	-2	-2	-2	-2	-2	-2	-2	-2
	AHA	8	8	8	8	8	8	8	8
Only visible with ATM = REL	ALR	-5	-5	-5	-5	-5	-5	-5	-5
	AHR	5	5	5	5	5	5	5	5
	ATI	T1	T1	T1	T1	T1	T1	T1	T1

		FD2-10 Default	FSL400H	FSL400G	FLS400M	FSL400L	FSL800H	FSL800G	FSL800M	FSL800L
	Parameter									
	ATD	90	**90**	**90**	**90**	**90**	**90**	**90**	**90**	**90**
	ADO	8	8	8	8	8	8	8	8	8
	AHM	NON	NON	NON	NON	NON	NON	NON	NON	NON
	AHT	65	65	65	65	65	65	65	65	65
	ACC	0	0	0	0	0	0	0	0	0
	IISM	HDD	NON	NON	NON	NON	NON	NON	NON	NON
Only visible when IISM is changed from NON	IISL	1	1	1	1	1	1	1	1	1
	IISH	1	1	1	1	1	1	1	1	1
	IISP	1	1	1	1	1	1	1	1	1
	IIHY	4	4	4	4	4	4	4	4	4
	IIFC	NON	NON	NON	NON	NON	NON	NON	NON	NON
	HDS	3	3	3	3	3	3	3	3	3
	IIDF	6	6	6	6	6	6	6	6	6
	SB	YES	YES	YES	YES	YES	YES	YES	YES	YES
	DS	YES	YES	NO	YES	YES	YES	NO	YES	YES
	DI2	NON	NON	NON	NON	NON	DS2	NON	DS2	DS2
	LSM	NON	NON	NON	NON	NON	NON	NON	NON	NON
	OA1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1
	INP	SN4	SN4	SN4	SN4	SN4	SN4	SN4	SN4	SN4
	OS1	0	0	0	0	0	0	0	0	0
	T2	NON	NON	NON	EVP	EVP	NON	NON	EVP	EVP
Shows only if T2 is enabled	OS2	0	0	0	0	0	0	0	0	0
	TLD	10	10	10	10	10	10	10	10	10
	SIM	5	5	5	5	5	5	5	5	5
	ADR	1	1	1	1	1	1	1	1	1

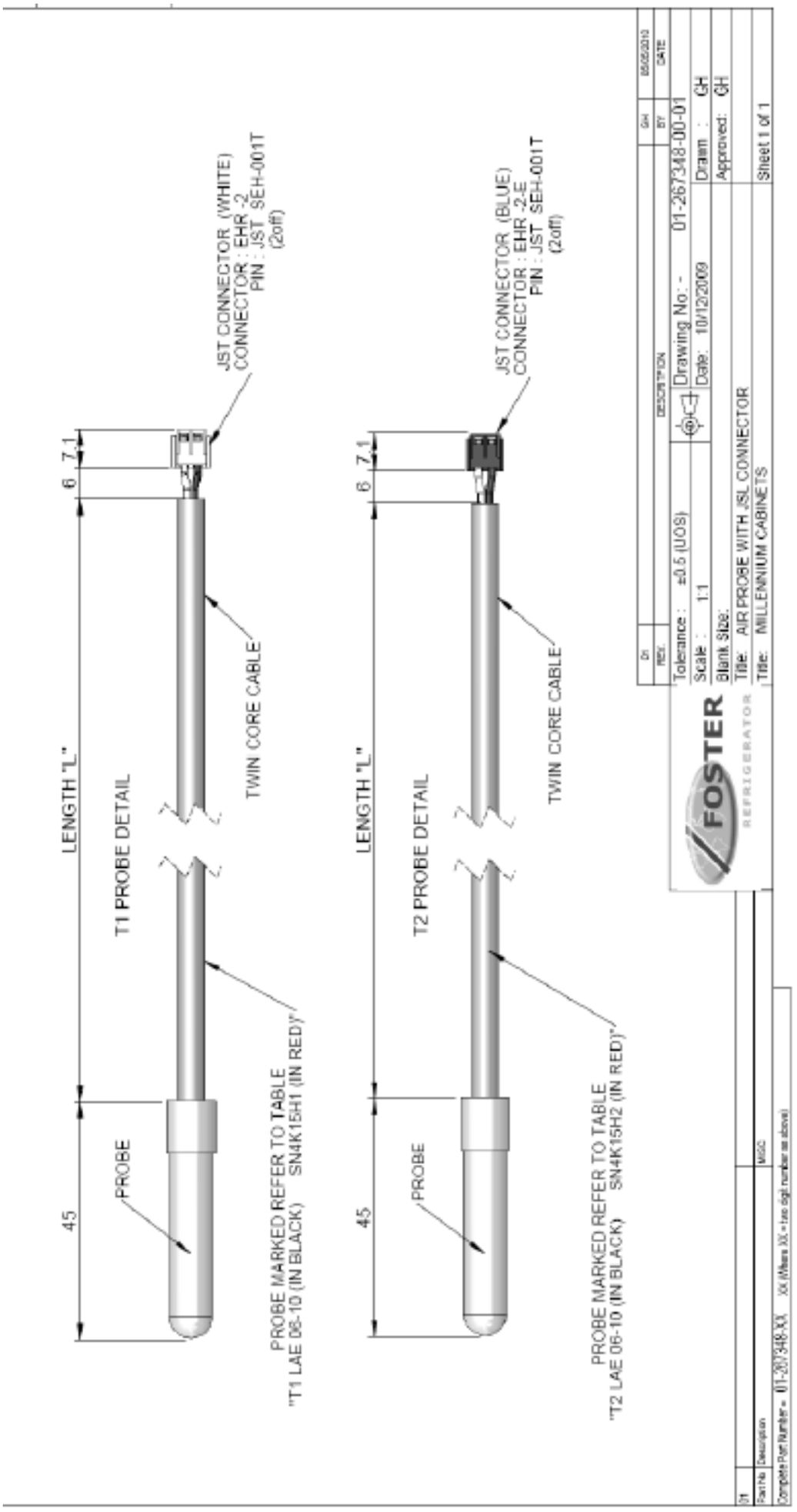
Slimline High Temp Integeral & Glass Door Models Wiring Diagram Post February 2019



Slimline Low/Meat Temp Integeral Wiring Diagram Post February 2019 Models



Air and Evaporator Probe Details / Diagram



Probe Air 2.5M SN4K15H1 (00-556284)
Probe Evap 2.5M SN4K15H2 (00-55627)

Troubleshooting

PROBLEM		Possible Cause		Solution
Audible & Visual Alarms / Warning	Lo	> Low temperature alarm	>	Cancel audible alarm and investigate cause.
	hi	> High temperature alarm	>	Cancel audible alarm and investigate cause.
	E1	> T1 Air probe failure	>	Check and replace the air probe.
	E2	> T2 Evaporator probe failure#	>	Check and replace the evaporator probe.
	cL	> Condenser clean warning#	>	Carry out cleaning regime on the condenser. The timer is reset when power is removed and reset.
	hc	> Condenser high temperature alarm#	>	Clean condenser and ensure ambient temperature is not too high.
	hP	> High pressure alarm#	>	Check ambient temperature and refrigeration system.
	do	> Door open alarm#	>	Press ⏻ to silence alarm and close the door. If the alarm persists and the door is closed check and replace the door switches.
# only displayed if applicable to model and enabled through parameters				
Compressor will not start		> No voltage in socket	>	Use voltmeter to check
		> Electrical conductor or wires may be cut	>	Use ohmmeter to check for continuity
	⚠	> Defective electrical component: thermostat, relay, thermal protector etc.	>	Replace defective component
		> Compressor motor has a winding open or shorted	>	Measure ohmic resistance of main and auxiliary winding using ohmmeter. Compare with correct values
	⚠	> Compressor stuck	>	Change compressor
		> Temperature control contacts are open	>	Repair or replace the contacts
		> Incorrect wiring	>	Check wiring diagram and correct
		> Fuse blown or circuit breaker tripped.	>	Replace fuse or reset circuit breaker
		> Power cord unplugged	>	Plug in power cord.
		> Controller set too high	>	Set controller to lower temperature.
		> Cabinet in defrost cycle	>	Wait for defrost cycle to finish

The Temperature is too cold	>	Controller is set at a very cold position	> Set to warmer position and check if the compressor stops according to controllers operating range.
	>	Controller does not disconnect the condensing unit	> Check the insulation of the thermostat. If problems persists, change the thermostat
	>	Control contacts are stuck closed	> Change the control. Check amperage load
	>	Defective or incorrect temperature control	> Determine correct control and replace
The Temperature is not cold enough	>	Controller is set at a very warm position	> Adjust to colder setting
	>	Condenser is dirty	> Clean condenser
	>	The refrigerator has been placed at an inadequate location	> The unit must not be near stoves, walls that are exposed to the sun, or places that lack sufficient air flow.
	>	Compressor is inefficient or there is a high pressure due to the air in the system	> If there is air in the system, purge and recharge
	>	Iced up evaporator coil	> Check temperature control, refrigerant charge, and defrost mechanism. Remove all ice manually and start over.
	>	Restriction in system	> Locate exact point of restriction and correct
	>	The refrigerator has been used improperly	> The shelves must never be covered with any type of plastic or other material that will block the circulation of cold air within the refrigerator.
	>	Too many door openings	> Advise user to decrease if possible
	>	Excessive heat load placed in cabinet	> Advise user not to put in products that are too hot.
	>	The refrigerator has been overcharged with the refrigerant gas	> Check to see if condensation or ice crystals have formed on the suction line. If so, charge with the correct amount of gas.
	>	The refrigerant gas is leaking	> Find the location of gas leak in order to seal and replace the defective component. Change the drier. Perform a good vacuum and recharge unit.
	>	The evaporator and/or condenser fans are not working	> Check electrical connections and make sure that the fan blade isn't stuck. Replace the fan motor if it doesn't work.

	>	Blocking air flow	> Re-arrange product to allow for proper air flow. Make sure there is at least four inches of clearance from evaporator.
	>	Fuse blown or circuit breaker tripped	> Replace fuse or reset circuit breaker.
Electrical Shocks 	>	Wires or electrical components are in direct contact with metallic parts.	> Check for appropriate insulation on the connections of each component.
Noise	>	The refrigerator is not properly levelled	> Check if the noise goes away after you level the refrigerator
	>	The condenser is not fastened correctly. Copper tubing is in contact with metal	> While the compressor is working, check to see if metal parts are in contact with one another and/or if the screws that fasten the condenser are tightened.
	>	The evaporator and/or condenser fans are loose	> Check if the fans are securely fastened. Also, check if the fan blades are loose, broken or crooked. If so, change the faulty blade.
	>	Compressor has an internal noise	> If the noise persists after all other measures have been taken, it may be originating from the compressor.
	>	Loose part(s)	> Locate and tighten loose part(s)
Extreme condensation inside the refrigerator	>	Controller is set at a very cold position	> Set the controller to a warmer position & check to see if compressor stops as should.
	>	The outside environment's relative humidity is very high (over 75%)	> This type of occurrence is caused by local climatic conditions and not by the refrigeration unit.
	>	The refrigerator door won't shut completely	> Check the door and/or the magnetic gasket. Adjust the door hinges if needed; replace the gasket if broken.
	>	The refrigerator had been placed at an inadequate location	> The unit must not be near sources that produce too much heat.
Condensing unit runs for long periods of time 	>	Excessive amount of warm product placed in cabinet	> Advise user to leave adequate time for products to cool down
	>	Prolonged door opening or door ajar	> Advise user to ensure doors are closed when not in use and to avoid opening doors for long periods of time.

> Door gasket(s) not sealing properly	> Ensure gaskets are snapped in completely. Remove gasket and wash with soap and water. Check condition of gasket & replace if necessary
> Dirty condenser coil	> Clean condenser coil
> Evaporator coil iced over	> Unplug unit and allow coil to defrost. Make sure thermostat is not set too cold. Ensure that door gasket(s) are sealing properly. Select manual defrost and ensure system works.

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