MAKING MODERN LIVING POSSIBLE

ERC 102 refrigeration controller
Reference manual

This reference manual is intended to be used primarily by OEMs for the purposes of programming ERC 102. It may also be useful for technicians. It is not intended as a user guide for end users.

www.danfoss.com/erc

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1. INTRODUCTION

The ERC 102 is an electronic refrigeration controller with an LED display especially developed for bottle coolers and commercial fridges and freezers. It is particularly suited for OEM customers where time, easy and reliable installation and high quality need to go hand in hand with flexibility.

The latest generation CPU, plenty of memory and high-end electronic components allow for a uniquely versatile software. Three separate password-protected user levels can be used to control more than 200 different parameters to fit all individual requirements.

ERC 102's IP rated body, advanced materials and internationally approved hardware design open it up for use in almost any climate globally, indoors as well as outdoors.

Laboratory work with ERC 102 is rendered easy and flexible. Danfoss KoolProg software with a USB-powered gateway accelerate programming; on the OEM assembly line, just one Danfoss unique Docking station can easily program up to 3,000 controllers a day – at zero inventory cost.

It uses a globally-compatible, lightweight, switch mode power supply.
All components have been carefully selected to help reduce the CO_2 footprint. The globally-compatible internal power supply uses an average of just 0.7W – 4 times less than an average controller today.

Sensors include ambient light for display brightness, which also detect shop opening hours for energy-saving routines. Door and temperature sensors provide input for controlling the compressor, the light, the fan and automatic defrosting.

2. CONTENT OF THE BOX

If delivered in a sample box the following content is shipped. The sample box is not available for other than sample purposes.

See Appendix II for code numbers and lengths. For box lots (pcs per box), please contact your local Danfoss representative.

2. 1 Main product

ERC 102 control unit without front frame.

NOTE: *The front frame is included in the sample box.*

2.2 Accessories

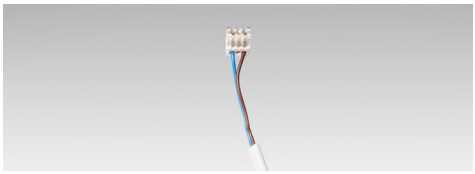
Control temperature sensor: see Appendix II for different lengths and connector types.

Defrost temperature sensor: should be mounted on the evaporator. For detailed mounting instructions, please contact your local Danfoss representative.

NOTE: *Defrost sensors can also be used as condenser sensors.*

Condenser temperature sensor: should be mounted on the condenser. For detailed mounting instructions, please contact your local Danfoss representative.

NOTE: *This sensor is not included in the sample box . Defrost sensors can also be used as condenser sensors.*

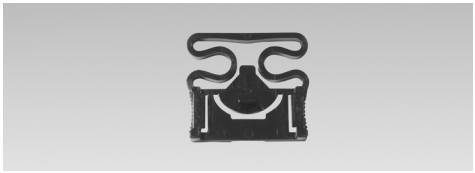


Door sensor connector cable: please see Appendix II for lengths and code numbers.

NOTE: *Door sensor: is optional and is a connector and cable with spade terminals compatible with door contacts used in refrigeration applications.*

Light sensor: is optional and is used to measure the level of ambient light around the cabinet so that night and day (Economy / Normal) modes of operation can automatically be set, as well as the brightness of the display.

Power plug: for laboratory use, low quantity OEM production or whenever spade connectors are not available.



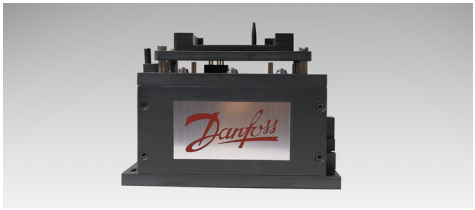
Clips: are used to secure the ERC 102 in place in the case of rear mounting. They are not used with front mounting. There are two identical clips, one placed on either side of the ERC 102. See Chapter 4 – Mounting – for further details.

2.3 Connections

Programming an individual unit in a laboratory: the USB gateway requires KoolProg Software running on a PC. It enables parameters to be set in real time and an array of status information to be read (bidirectional connection). This method is used to determine the correct parameters during R&D.

Once the desired settings have been determined, a KoolProg ERC specific parameter file is saved to the EKA183 USB copy key for later mass programming.

The USB Gateway is a laboratory tool, offering fast and easy programming of any ERC102 controller. KoolProg software installation is provided; the gateway is standard inventory for OEM labs.



Mass programming on an assembly line: the docking station is used for high volume programming of ERC controllers, for example on an assembly line. The docking station is a write-only device.

See above (Programming an individual unit) for preparing the EKA183 USB copy key, which is to be inserted into the docking station. The settings are then loaded into each successive controller in a matter of seconds.

KoolProg software is not required for mass programming.

Note: please refer to the koolprog manual for more details about programming.

koolprog™

KoolProg: is the software from Danfoss for programming the ERC 102 via a USB cable and a PC rather than with the front panel buttons. Please refer to the KoolProg manual for details.

3. OVERVIEW OF THE PRODUCT

The ERC 102 is a state-of-the art, IP65 (front)-rated refrigeration controller for use in both Glass Door Merchandising and Commercial Fridges and Freezer applications.

With four inputs and four outputs, powerful algorithms and input from multiple sensors, the ERC 102 delivers both energy-saving routines and compressor, light, fan and defrost control.

Together with the Danfoss docking station, programming of pre-prepared parameter sets can be achieved in just five seconds. There are over 200 parameters (see Chapter 7) including innovative features such as night mode detection, store opening detection, door open alarm control and display dimming for restaurants.

The ERC 102 can also be programmed via USB using the Danfoss KoolProg software, allowing the most suitable parameter findings to be found quickly during the application development process.

It is also possible to operate and program the controller using the control buttons (only when actually installed in a refrigerator / freezer).

Overview of ERC 102 models:

Model:	Digital outputs:
ERC 102A	1 relay
ERC 102C	3 relays
ERC 102D	4 relays

3.1 Control buttons

The ERC 102 has **four buttons** (circled in image) on the front which can be programmed to perform different functions. See Chapter 6 – Configuration of inputs and outputs for detailed information.

3.2 Connector inputs

Connect up to four Danfoss original sensors according to your application needs.

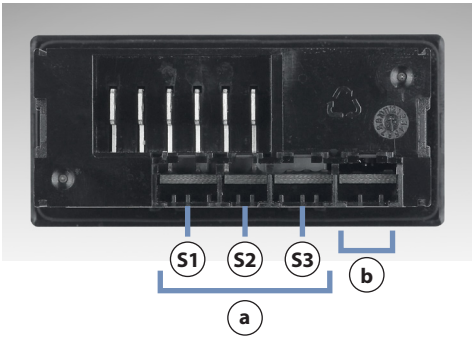
There are three **analogue inputs**: S1, S2 and S3 ((a)).

Supported input options:
- Ambient light - analogue data [luminens]
- Cabinet (air) temperature - analogue data [°C]
- Evaporator temperature - analogue data [°C]
- Condenser temperature - analogue data [°C]
- Digital input - binary data [on/off]

There is one **digital input:** diC ((b)) for PC communication being used either with a door sensor or with the USB Gateway.

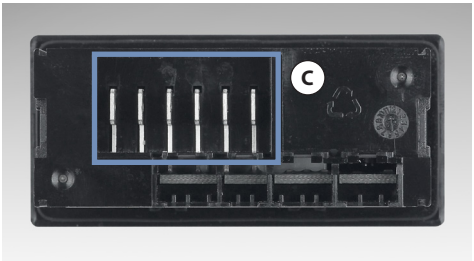
NOTE: *for detailed information refer to section 6.1.*

The **ambient light** sensor can be used for determining shop open / closed times for economy mode switching, for determining the brightness of the LED display or both.



3.3 Connector outputs

All **four outputs (Ⓒ)** are digitally controlled on/off relays.



Functions controlled are:
- Compressor
- Pilot Relay
- Heater
- Defrost heater / valve for hot gas
- Alarm
- Fan
- Light

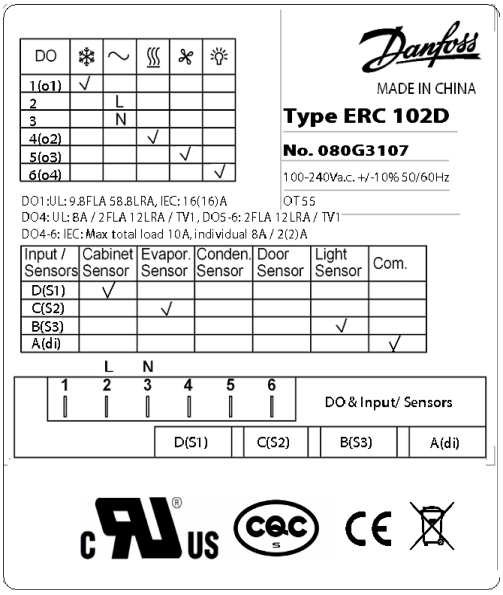
3.4 Top label

The illustration shows an example of a top label affixed to an ERC 102D. The examples show what is connected:

- Output 1 is used to switch the compressor on and off.
- Outputs 2 and 3 are power – Live and Neutral.
- Output 4 is used to switch the heater on and off.
- Output 5 is used to switch the fan on and off.
- Output 6 is used to switch the light on and off.

- Input D (S1) is connected to a Cabinet Sensor to measure temperature inside the cabinet.
- Input C(di) is used for Communications – a docking station or KoolProg software running on a PC.
- Input B(S2) is connected to an Evaporator Temperature Sensor.
- Input A(S3) is connected to an Ambient Light Sensor.

NOTE: *Parameters depend on the code number supplied. Please refer to the code number specific technical drawing or use the KoolProg information menu. For other applications, a condenser sensor and a door sensor may be used.*



4. MOUNTING

There are three options for mounting the ERC 102 in a freezer or refrigerator.

⚠ SAFETY INFO
Risk of electrocution!
For mounting: Do not connect mains power until the controller is correctly mounted.
For unmounting: Disconnect the power supply before unmounting.

4.1 Rear mounting – Option 1

1. Insert the ERC 102 into the cabinet.

2. Attach the clips to each side of the ERC 102.

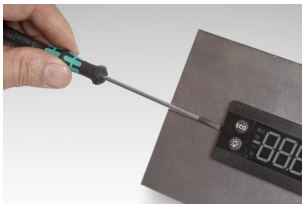
3. Place the front frame on to the ERC 102 and click it into place.

4. Connect the sensors and outputs as required and then the power cable (see Chapter 6 – parameters for information about programming which inputs and outputs are applicable to your configuration).

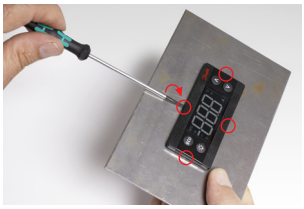
4.1.1 Unmounting

1. Disconnect the power cable and then the sensors.

2. Use a flat head screwdriver (ideally the one supplied with the ERC 102 sample package) and insert it carefully between the front frame and the controller.



3. Gently **twist** the screwdriver to remove the front frame. Do this in four places next to each clip area.



5. Reach around the side to the clips.

6. Press the centre section of each clip to release them in turn. Push the controller carefully out of the cabinet.

4.2 Front mounting – Option 2

1. Connect all the cables as required (see Chapter 6 – parameters for information about programming which inputs and outputs are applicable to your configuration).

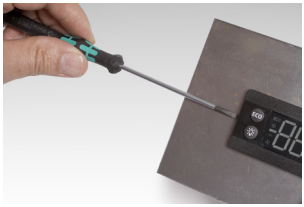
2. Insert the ERC 102 into place in the cabinet.

3. Press the front frame into place – this locks the ERC 102 into position.

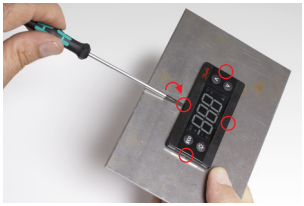
   NOTE: *there is no need to use the clips for front mounting.*

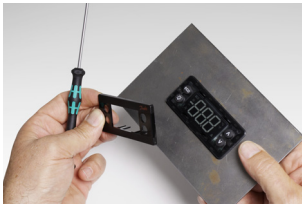
4.2.1 Unmounting

1. Use a flat head screwdriver (ideally the one supplied with the ERC 102 sample package) and insert it carefully between the front frame and the controller.



2. Gently **twist** the screwdriver to remove the front frame. Do this in four places next to each clip area.





3. Cabinet. Do not use a different type of screwdriver or a sharp item such as a knife which risks causing damage.

4.3 Fully integrated design – Option 3

An option is available for OEMs wanting to use the ERC 102 in a fully-integrated design. Please contact your local Danfoss representative for more information.

5. CONTROLLING / NAVIGATION AND ACCESS LEVELS

The ERC 102 can be controlled in three ways: using KoolProg software, the Danfoss Docking Station or manually by means of the buttons on the front panel.

5.1 KoolProg/Gateway

KoolProg is licenced Danfoss software offering easy parameter setup via a USB gateway. This software is supplied separately; for technical literature and further information, please contact your local Danfoss representative.

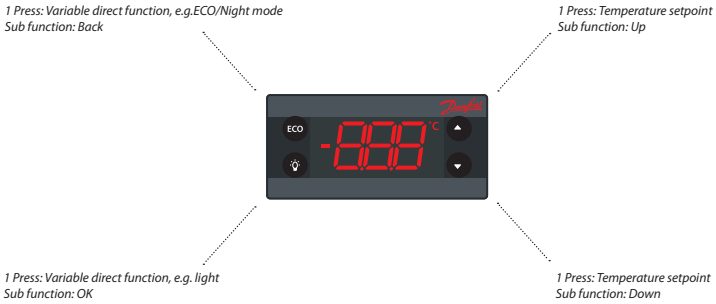
5.2 Docking station

The ERC 102 controller docking station is supplied separately. For further information, please contact your local Danfoss representative.

5.3 Manual operation with buttons (Direct Access)

Explained as follows:

5.3.1 ERC Front and Button Functionallity



5.3.2 Direct functions for access

Changing the Desired Temperature Setpoint (applies similarly when using Fahrenheit scale):

1.)

The display shows the current temperature.

(Current temperature)

2.)

Press: up/down to adjust setpoint

(Flashing: temperature setpoint)

3.)

After 30 seconds, the display automatically reverts to showing the current temperature

(Flashing: temperature setpoint)

4.)

Turning On/Off the ECO Function:

1.)

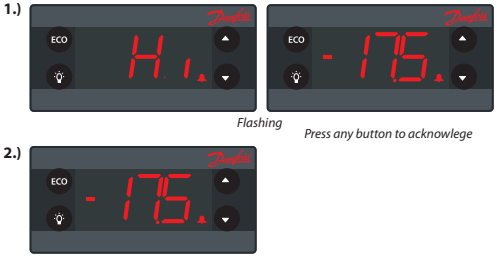
Press briefly to enter ECO mode

2.)

The green ECO symbol is lit when in ECO mode

Turn ON/Off the Light

Acknowledging Alarms:



5.3.3 Operating the menu

Button assignments in this manual refer to the Glass Door Merchandiser default ERC 102. For customised controls you may assign different shortcuts (ASI menu --> button configuration). Use this feature only when the ERC 102 is supplied without button prints.

INFO: *Some parameters may be hidden to you. When scrolling through menus, the parameters available will have been pre-determined using KoolProg software. Your access level will determine which parameters you can view and edit.*

Example of Changing a Parameter:

1.)

Press and hold for 5 seconds to enter the menu

2.)

Press: up/down to scroll through the menu

(scroll through parameter groups)

3.)

To select: press the lower left button (OK)

4.)

Press: up/down to find the desired parameter

(scroll through group "dEf" parameters)

5.)

To confirm: press the lower left button (OK)

6.)

Press: up/down to enter the desired value

7.)

Press: OK to accept and return to parameter name

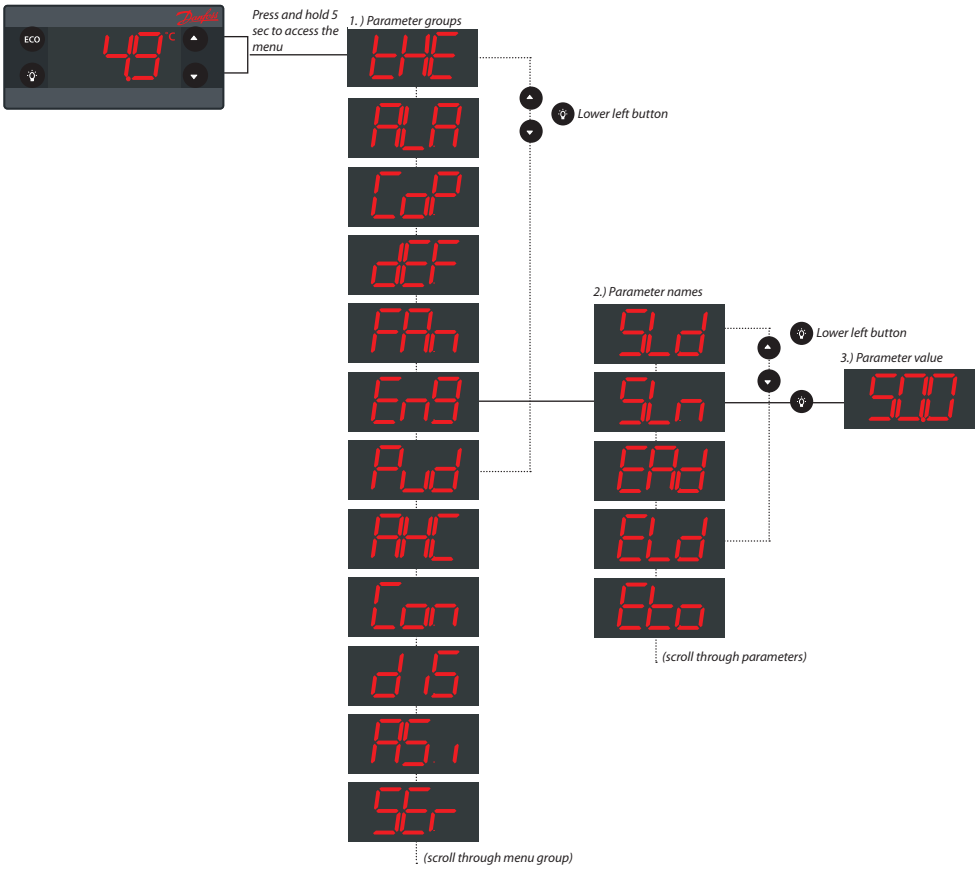
8.)

Press: upper left button (back) to return to parameter group

9.)

Press: upper left button (back) to return to the menu

5.3.4 Menu structure



5.3.5 Password protection

6. CONFIGURATION OF INPUTS AND OUTPUTS

The ERC 102 inputs and outputs are configurable by the customer. Before getting started it is a good idea to check if all inputs are configured correctly and match the sensors attached.

Input and output configuration settings are part of the assignment menu (ASi).

NOTE: *Coded sensors will impact on the number of possible configurations.*

For instance: Danfoss supplies only 2-pole defrost sensors, so input S3 will most likely be used as a defrost / evaporator temperature sensor input.

Please contact your local Danfoss representative for information about default settings.

Assignments / ASi

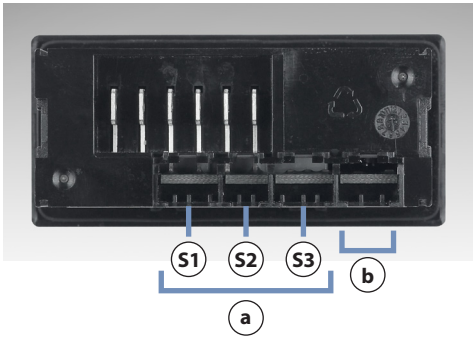
6.1 Changing input and output configuration settings

There are two steps to inputting the configuration:

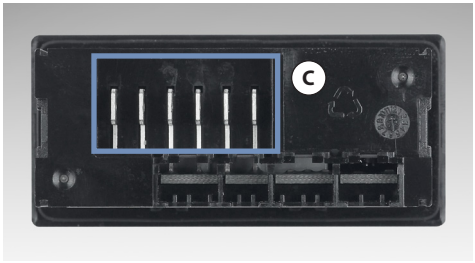
1. Define the type of sensor attached to the input:
- Temperature / light / digital

2. Define the application for the sensor:
- Temperature: control / condenser / evaporator
- Light: ECO / display / both
- Digital: door sensor

Example: Input S1 is attached to a temperature sensor. The sensor measures cabinet temperature.
Example: Input S2 is attached a digital on/off sensor which is a door open / closed switch.



Connector inputs: analogue (ⓐ), digital (ⓑ)



Connector outputs (ⓒ)

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Assignments	**ASi**							
S1 Config	S1C	Stn	Stn	dig	no			-- -- RW
S2 Config	S2C	Stn	Stn	dig	no			-- -- RW
S3 Config	S3C	Stn	Stn	dig	no			-- -- RW
S1 Application	S1A	SCo	nC	doo	no			-- -- RW
S2 Application	S2A	nC	nC	doo	no			-- -- RW
S3 Application	S3A	nC	nC	doo	no			-- -- RW
DI Config	diC	dio	doC	dio	no			-- -- RW
DO1 Config	01C	CoP	CoP	HEt	no			-- -- RW
DO2 Config	o2C	dEF	0	Lig	no			-- -- RW
DO3 Config	o3C	FAn	0	Lig	no			-- -- RW
DO4 Config	o4C	dEF	0	Lig	no			-- -- RW
Button 1 Short Config	b1C	noP	tP	noP	no			-- -- RW
Button 1 Long Config	b1L	PoF	tP	PoF	no			-- -- RW
Button 2 Short Config	b2C	dEF	tP	noP	no			-- -- RW
Button 3 Short Config	b3C	tP	tP	noP	no			-- -- RW
Button 3 Long Config	b3L	ECo	tP	PoF	no			-- -- RW
Button 4 Short Config	b4C	tn	tP	noP	no			-- -- RW
Button 4 Long Config	b4L	Lig	tP	PoF	no			-- -- RW
Password level1	PS1	0	0	999	no			RW RW RW
Password level2	PS2	0	0	999	no			-- -- RW
Password level3	PS3	0	0	999	no			-- -- RW
Cabinet Light Control Source	CLC	Lig	Lig	LEC	no			-- -- RW
Light off delay	Lod	0	0	300	no	Sec	1	-- -- RW

S1 Config / S1C
S2 Config / S2C
S3 Config / S3C
Available options are:
Stn for a temperature sensor (values given in Celsius)
Ldr for a light sensor (values given in Luminens)
Dig for a digital sensor with simple on/off indication

S1 Application / S1A
S2 Application / S2A
S3 Application / S3A
Available options are:
nC: Not connected
SCo: Temperature control
EuA: Evaporator temperature
Con: Condenser temperature (Condenser cleaning)
LS1: Light sensor (Ldr), Luminens, dedicated to Eco mode switching detection
LS2: Light sensor (Ldr), Luminens, dedicated to determining LED intensity
LS3: Light sensor(Ldr), Luminens, used for both Eco mode detection and determining LED intensity
doC: Door contact, contact closed when door closed
doo: Door contact, contact open when door closed

DI Config / diC
This is the digital input used for a digital sensor or bus communications.
doC: Door contact, contact closed when door closed
doo: Door contact, contact open when door closed
bus: Modbus communication (used only for KoolProg)
diO: One Wire Communication

D01 Config / D1C
CoP: Direct compressor control
Pil: Pilot Relay (No Zero Cross) – if using pilot relay to control a compressor, this option must be used instead of CoP
Het: Heating application, inverse output.

D02 Config / o2C
D03 Config / o3C
D04 Config / o4C

nO: not used
dEF: Electric Defrost Heater / Valve for hot gas
ALA: Alamr Output
Fan: Fan control
LIG: Light control

6.2 Program the buttons

Button 1 Config (short press) / b1C
Lower left button
Button 1 config (long press) / b1L
Lower left button
Button 2 Config (short press) / b2C
Upper left button
Button 3 Config (short press) / b3C
Upper right button
Button 3 config (long press) / b3L
Upper right button
Button 4 Config (short press) / b4C
Lower right button
Button 4 Config (long press) / b4L
Lower right button

The buttons can be programmed as follows:

Short press function	Long Press function
tP: Increase Setpoint	tP: Increase Setpoint
tn: Decrease setpoint	tn: Decrease setpoint
ECo: Toggle Eco mode	ECo: Toggle Eco mode
Lig: Toggle light	Lig: Toggle light
dEF: Toggle defrost	dEF: Toggle defrost
SuP: Toggle Super-Cool /Pull-down	SuP: Toggle Super-Cool /Pull-down
diP : Increase display intensity	diP : Increase display intensity
din : Decrease display intensity	din : Decrease display intensity
	Not operating
	ERC power ON/OFF

NOTE: Buttons 1, 3 and 4 can be assigned to operate with 2 functions (short press or long press).
NOTE: Your assignments may not be shown on the printed buttons. We advice to use this functionality together with the fully integrated mounting model only.

6.3 Set passwords

Password level 1 / PS1
Password Level 2 / PS2
Password Level 3 / PS3
These assign passwords to the three levels of access. The password is a three-digit number. Access levels are Shop, Service and OEM. You may not therefore have access to change all the passwords. Passwords are entered by using the up and down arrow buttons.
Danfoss advises against using passwords which are easy to remember or enter, for example 111, 222, 123 etc.

NOTE: *When accessing the controller with 3 wrong password in a sequence ERC will automatically block access for 15 minutes.*

6.4 Set lighting function

Cabinet Light Source Control / CLC
This parameter can be set to one of these alternatives to control the light in the cabinet:
Lig: button only – the light will only come on when the light button on the ERC 102 is pressed (toggle functionality).
Ldo: door (and button if defined) only
LEC: economy (and button if defined) only

Light off delay / Lod
Number of seconds the light will stay on after the door has been closed.

7. PARAMETERS

This chapter details all user-accessible parameters in ERC 102 software 5.05.

NOTE: *Incorrect parameter settings can lead to inadequate cooling, excessive energy consumption, unnecessary alarms and in the case of temperature-sensitive food storage, breaches in food hygiene principles and regulations. Only a trained operator should make changes to parameters.*

INFO! *Some parameters may be hidden to you. When scrolling through menus, the parameters available will have been pre-determined using KoolProg software. Your access level will determine which parameters you can view and edit.*

The access level can be set separately for each parameter using KoolProg software. There are three levels of access – 1, 2 and 3. Level 1 is for shop access, level 2 for technicians and level 3 for OEMs. The access levels cannot be set using the buttons. Passwords for the different levels can however be altered for the level of access you have – for example a level 2 user can change the password for level 1 and level 2 but not level 3.

7.1 Thermostat / tHE

ERC 102 can handle both Celsius and Fahrenheit. Changing from C to F and vice-versa is done in the Display menu. When the change is made, all temperature values are automatically re-calculated and updated in all other parameters accordingly.

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Thermostat	**tHE**							
Set point adjustment ratio	SPr	0.5	0.0	1.0	no		.1	-- -- RW
Differential	diF	2.0	0.0	20.0	C/F r	K	.1	-- RW RW
High Set Point	HSE	50.0/122.0	-50.0/122.0	80.0/176.0	C/F a	°C/°F	.1	-- RW RW
Low Set Point	LSE	-35.0/-31.0	-35.0/-31.0	80.0/176.0	C/F a	°C/°F	.1	-- RW RW
Air Temp Adj.	tAd	0.0/0.0	0.0/0.0	20.0/36.0	C/F r	K/°R	.1	-- -- RW

Set point / StP
StP is visible with KoolProg software only. This parameter defines the desired temperature (set point). In standard operation the set point is changed by simply pressing the "temperature up / down" buttons on ERC102; for laboratory and assembly line you may opt for software controlled set point adjustment (speed improvement)

Set point adjustment ratio / SPr
The default value is set to 0.5 and the parameter is hidden by default.
Spr defines the position of the setpoint in relation to cut-in and cut-out.
Spr = 0,5 sets the setpoint mid between cut-in and cut-out. Spr = 0 sets the setpoint at the cutout. Spr =1 sets the setpoint at cut-in.

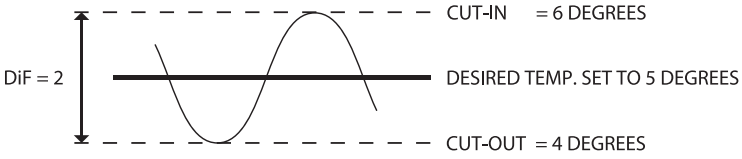
Differential / diF
This defines the difference between the cut-out and the cut-in. The desired temperature is determined by SPr and diF.

High Set Point / HSE
Low Set Point / LSE
These parameters define the temperature range limit of the controller. Once set, the desired temperatue (setpoint) can not go above HSE or below LSE.

LSE Sets the minimum value for the set point
HSE Sets the maximum value for the set point

Cut-in and cut-out are automatically calculated from the desired setpoint (set bybuttons on the control) and the differential. By default, cut-out and cut-in are 0,5*DiF above or below the desired temperature.

Example: The desired average temperature in the cabinet is 5 degrees, and the differential is set to 2 degrees:



Air Temperature Adjustment / tAd
This parameter is a relative value and allows adjustment of the control sensor temperature.
For instance, at a measured temperature of 7*C and tAd set to -2K, the input from the control sensor will be 5*C instead.

7.2 Alarms / ALA

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Alarm	**ALA**							
High Alarm delay	Htd	30	0	240	no	min	1	-- RW RW
Low Alarm delay	Ltd	0	0	240	no	min	1	-- RW RW
High Temp Alarm	HAt	15.0/59.0	-50.0/-58.0	80.0/176.0	C/Fa	°C/°F	.1	-- RW RW
Low Temp Alarm	LAt	-50.0/-58.0	-50.0/-58.0	80.0/176.0	C/F a	°C/°F	.1	-- RW RW
Pulldown delay	Pdd	240	0	960	no	min	1	-- RW RW
Door Open delay	dod	2	0	60	no	min	1	-- RW RW
Alarm Buzzer Duration	Abd	0	0	999	no	min	1	-- RW RW
Auto Clearance of Alarm/Error	ACA	yES	no	yES	no		1	-- RW RW

High Temp Alarm / HAt
Low Temp Alarm / Lat
High temperature alarm and low temperature alarm allow for individual alarm setpoints. Both are absolute values. By setting HAt to the maximum value and LAt to the minimum value, alarms will be deactivated.

High Alarm Delay / Htd
Low Alarm Delay / Ltd
These parameters express the number of minutes to wait before sounding an alarm once the High/Low Temp Alarm temperature is reached. Immediately prior to the alarm sounding, another check of the temperature is made to see if the temperature is still in the alarm zone; if it is not, the then the alarm is not sounded. In most situations, the Low Alarm Delay will be set to 0 to warn about too low a temperature immediately.

Pulldown Delay / Pdd
Normally, it is not necessary or desirable to sound an alarm during a pull down (the initial phase of reaching the desired temperature). This parameter prevents the High Temp Alarm HAt sounding during pull down and after a defrost for the number of minutes set for the parameter.

NOTE: *It does not apply to the Low Temp Alarm LAt.*

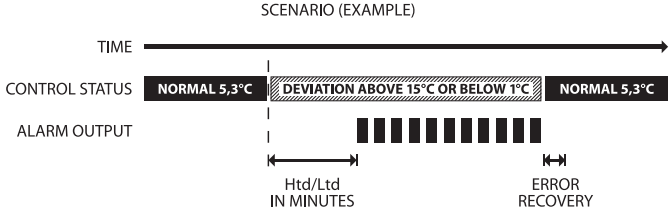
Door Open Delay / dod
It is possible to indicate to customers that a door has accidentally been left open. This parameter sets the delay in minutes before the alarm sounds. This is useful in environments where customers / users may hold the door open while making their selection. If the door is closed again before the set number of minutes is reached, the alarm does not sound.

NOTE: *A door sensor is required if this parameter is to be activated.*

Alarm Buzzer Duration / Abd
The ERC 102 alarm sounds for 10 seconds, followed by silence for 50 seconds. One alarm sequence therefore lasts 60 seconds. These values cannot be changed. This parameter determines how long in minutes an audible alarm will continue while there is still a reason to have an alarm. If set to 999, the alarm will continue to sound until the reason for the alarm is cleared – for example the temperature has dropped enough or the door closed. In some cases, it may be necessary for a user or technician to take action in order to clear the alarm. If set to 0, the alarm will never sound.

Auto Clear of Alarm / Error / ACA
If this parameter is set to nO:
The alarm status will **not** disappear automatically even if the condition which caused the alarm is no longer valid or present.
If set to yES:

As soon as the condition which caused the alarm is no longer valid or present, the alarm status will automatically change back to inactive. There will be no trace of the alarm having occurred.
In general, Glass Door Merchandise applications will be set to yES and Commercial Fridges and Freezers set to nO. For example, if the temperature goes too high for a period there may be food safety considerations in a freezer containing food but not in a fridge with cold drinks.



7.3 Compressor / CoP

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Compressor	**CoP**							
Min run time	Crt	0	0	30	no	min	1	-- RW RW
Min Stop time	CSt	0	0	30	no	min	1	-- RW RW
Max Off time	Cot	0	0	480	no	min	1	-- -- RW
Error run time	Ert	0	0	60	no	min	1	-- -- RW
Error stop time	ESt	1	0	60	no	min	1	-- -- RW
Minimum cut-in voltage	uLi	0	0	270	no	Vac	1	-- -- RW
Minimum cut-out voltage	uLo	0	0	270	no	Vac	1	-- -- RW
Maximum voltage	uHi	270	0	270	no	Vac	1	-- -- RW
Power On Delay	Pod	300	0	300	no	Sec	1	-- RW RW
Power Factor	PFA	0	-90	90	no	Degree	1	-- -- RW
Initial cut in	iCi	no	no	yes	no		1	-- R- RW
Compressor door open delay	Cdd	0	0	15	no	min	1	-- RO RW

Minimum Run Time / Crt
This parameter is a number of minutes from 0 to 30.
It determines the minimum number of minutes the compressor must run before a Temperature cut-out can take effect. For example, if the temperature sensor indicated that the cut-out temperature has been reached, but the number of minutes set in this parameter have not elapsed since the compressor last started, then the compressor will continue. It will only stop once the duration given by Crt has been reached – provided the temperature is still low enough.
Crt thus overrides the cut-out.

Minimum Stop Time / CSt
This parameter is a number of minutes from 0 to 30.
It determines the minimum number of minutes the compressor must remain idle before a Temperature cut-in can take effect. For example, if the temperature sensor indicates that the cut-in temperature has been reached, but the number of minutes set in this parameter have not elapsed since the compressor last stopped, then the compressor will stay off. It will only start once the duration given by CSt has been reached – provided the temperature is still high enough.
CSt thus overrides the cut-in.

Maximum Off Time/ Cot
This is the maximum time in minutes the compressor is allowed to idle – up to 480 minutes. Cot is set to zero by default (inactive). If ERC102 is to be used on a draft beer (ice bank) application, this parameter can be used to control the ice thickness.

Error Run Time / Ert
Error Stop Time / ESt
These two parameters only become active in the unlikely event of a broken temperature sensor. They are then used to run the application in safety mode. At the same time the sensor error will be shown in the display.

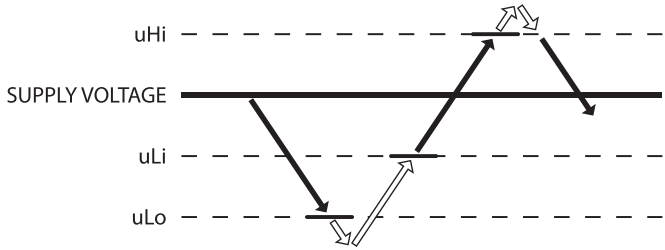
Ert and ESt values are based on OEM experience and are by default inactive.
Ert and ESt define the duration the compressor will run (Ert) and be idle (ESt).
Example: Ert = 4 [min] and ESt = 16 [min] will provide an average cooling system activity of 20%.

Minimum cut-in voltage / uLi
Minimum cut-out voltage / uLo
Maximum voltage / uHi
These three parameters provide voltage protection to the compressor. Start by setting uHi, followed by uLo and uLi.

uLi: When the compressor is due to start, the voltage of the power supply will be checked and the compressor will only be allowed to start if it is at least the value given in this parameter.

uLo: When the compressor is running, it will be switched off if the voltage goes below that given in this parameter.

uHi: When the compressor is running, it will be switched off if the voltage exceeds that given in this parameter. If the compressor is already stopped, it will remain switched off.



Power On Delay / Pod
This is the delay in seconds between power-on and the compressor being activated. Depends on the Power on Temperature setting as explained below.

Power Factor / PFA
This value is hidden by default. The parameter is used by the Zero Cross function to optimize the switching position of the relay contact.

⚠ **Warning: Do not change without first consulting your local Danfoss representative.**

Initical Cut-in / iCi
if the control temperature is between cut-in and cut-out at power up customers can determine if the compressor shall start immediatly (yes) or wait for cut-in temperature to start (no).

Power on Temperature / PoT
This parameter is used to accelerate the first application test on the OEM assembly line; if the cabinet temperature is higher than this parameter the Power On Delay is overruled and the outputs are activated without delay.

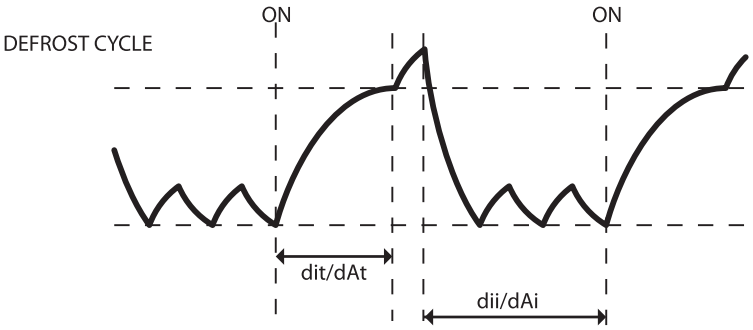
Compressor Door Open Delay / Cdd
This parameter sets the delay in minutes before the compressor stops when the door is opened. If set to zero, the function is disabled.

7.4 Defrost / dEF

Note: ERC controllers feature Safe Defrost functionality (patents pending) by default. This function ensures proper defrost under poor power conditions.

For more details please contact Danfoss.

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Defrost	**dEF**							
Def type	dFt	no	no	Hgd	no			-- RW RW
Def reset temp	drt	5	0	80	C/F a	°C	1	-- RW RW
Def Min Interval	dii	6	0	96	no	hour	1	-- RW RW
Def Max Interval	dAi	7	0	96	no	hour	1	-- RW RW
Def Min Time	dit	5	0	240	no	min	1	-- RW RW
Def Max time	dAt	30	0	480	no	min	1	-- RW RW
Drip off time	dot	0	0	60	no	min	1	-- -- RW
Fan delay after Defrost	Fdd	0	0	60	no	min	1	-- -- RW
Fan start Temp	Ftd	25.0/77.0	-25.0/13.0	25.0/77.0	C/F a	°C/°F	.1	-- -- RW
Defrost Fan on	dFA	no	no	yES	no		1	-- -- RW
Initial Defrost Interval	idi	3	0	96	no	hour	1	-- -- RW
Initial Defrost Duration	idd	100	0	999	no		1	-- RW RW
Defrost on compressor time	dCt	no	no	yES	no		1	-- -- RW



Defrost Type / dFt
When set to nO, the defrost function is disabled and no automatic defrosting will occur.

When set to EL or nAt, electrical, natural or off-cycle defrosting is used. An additional setting of Hgd (hot gas defrosting) is available.

Terminate Temperature / dtt
This parameter defines at what temperature the defrost cycle will stop. The temperature is given by the evaporator sensor or by the cabinet temperature sensor if no evaporator sensor is used.

Defrost reset temperature / drt
The defrost counter is saved and restored at power-up, but if the temperature sensor, used for defrost, is higher than this value at power-up, it is assumed that the evaporator is free of ice and the defrost counter will be cleared.

Minimum Interval / dii
This parameter can be set to between 0 and 96 hours and defines the minimum time period between the start of two defrost cycles. Once the minimum interval has expired, the defrost cycle will start at the following cut-out or once the maximum interval dAi has been reached.

Maximum Interval / dAi
This parameter can be set to between 0 and 96 hours and defines the maximum time period between the start of two defrost cycles.

Minimum Time / dit
This parameter can be set to between 0 and 240 minutes and defines the minimum duration of a defrost cycle. During this period, the ERC 102 will not check the temperature. Once the minimum time has expired, the temperature will be checked and if the Terminate Temperature dtt has been reached, the defrost cycle will end. If dtt has not been reached, defrost will continue until either dtt is reached or the Maximum Time dAt reached, whichever occurs first.

Maximum Time / dAt
This parameter can be set to between 0 and 240 minutes and defines the maximum duration of a defrost cycle.
The ERC 102 will not allow a maximum time to be entered which is less than the minimum time, or a minimum time which is more than the maximum time.

Drip Off Time / dot
This is only used with an electrical heater. This parameter can be set to between 0 and 60 minutes and defines how long the delay is between the heater being switched off and the compressor starting again.

Fan Delay after Defrost / Fdd
This parameter can be set to between 0 and 60 seconds and defines how long the delay is between the start of the compressor after defrost and the fan starting again.

Fan Start Temperature / Ftd
This only applies if an evaporator temperature sensor is fitted. This parameter determines at what evaporator temperature the fan will start after a defrost cycle is complete.
If the time set in Fdd occurs before the temperature set in Ftd, the fan will start in line with Fdd. If the temperature set in Ftd occurs first, then the fan will start in line with Ftd. It is therefore a case of whichever parameter's setting is reached first which determines when the fan starts.

Defrost Fan On / dFA
Set to yES, the fan will constantly run during defrost cycles.
Set to nO, the fan will not run during defrost cycles.

Initial Defrost Interval / idi
The initial defrost interval determines the time for first defrost after power-up. The initial defrost is mainly intended for factory testing of the defrost functionality and can be set to expire after a number compressor cycles according to the setting of parameter idd . During normal operation, the defrost counter will be saved in memory and restored after power loss, making the initial defrost unnecessary.

Initial Defrost Duration / idd
The initial defrost duration is the number of compressor cycles before the initial defrost is deactivated.
0: idi No initial defrost
1-998: number of compressor cycles before deactivation
999: Initial defrost always active.

Defrost On Compressor Time / dCt
If this parameter is set to yES, then defrost cycles are based on the total time the compressor has been running.

If this parameter is set to nO, then defrost cycles are related to elapsed time, regardless of how long and how often the compressor has been on.

7.5 Fan / FAn

The fan parameters are all related to energy saving, and to redistribution of air within the cabinet to reduce the amount of energy spent on cooling.

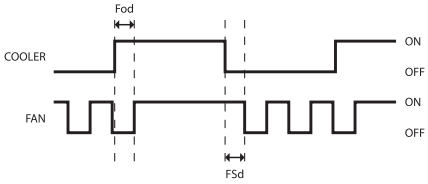
	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Fan	**FAn**							
Fan always On	FAo	yES	no	yES	no		1	-- -- RW
Fan stop time on door open	Fdt	999	0	999	no	Sec	1	-- -- RW
Fan On Delay	Fod	0	0	240	no	Sec	1	-- -- RW
Fan Stop delay	FSd	0	0	240	no	Sec	1	-- -- RW
Fan On Cycle	FoC	0	0	960	no	Sec	1	-- -- RW
Fan Stop Cycle	FSC	0	0	960	no	Sec	1	-- -- RW

Fan Always On / FAo
If this parameter is set to yES, all other parameters in this section about the fan are deactivated.
NOTE: *If FAo is set to nO, then the following parameters will be applied.*

Fan stop time on door open: Fdt
The maximum time the fan will be stopped after the door has been opened.
0: fan will not stop under opening
1-998: number of seconds fan will be stopped during door opening
999: fan will be stopped as long as the door is open

Fan On Delay / Fod
Fan Stop Delay / FSd
If this parameter and FSd are both set to zero then the fan runs whenever the compressor runs.

Fod defines the fan delay (in seconds) after a compressor cut-in.
FSd defines the fan delay after a compressor cut-out.



Fan On Cycle / FoC
Fan Stop Cycle / FSC
When the compressor is off, and FoC or FSC are not zero, the fan runs in cycles according to FoC and FSC.
Example: FoC = 120 [sec] and FSC = 120 [sec] means that the fan runs for half the time when the compressor is off. When the compressor is on, the fan is always on (according to FAo and Fod).

7.6 Energy Management / Eng

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Energy management	**Eng**							
Shop Light Day	SLd	50	0	100	no	%	1	RW RW RW
Shop Light Night	SLn	50	0	100	no	%	1	RW RW RW
Eco Activity delay	EAd	0	0	360	no	min	1	RW RW RW
Eco Light delay	ELd	5	0	10	no	min	1	-- RW RW
Light Blocking delay	Lbd	0	0	360	no	min	1	-- RW RW
Eco Temperature Offset	Eto	4.0/7.2	0,0	10.0/18.0	C/F r	K/°R	.1	-- RW RW

NOTE: *Some of these parameters require the installation of the Danfoss Ambient Light Sensor.*

The Danfoss USB Gateway in combination with KoolProg software allows for real time measurement of the current light intensity. Danfoss recommends testing and adjusting SLd and SLn values according to customers' specific needs.

Shop Light Day / SLd
Shop Light Night / SLn
These parameters are set as the percentage of the maximum light and determine when the device moves into or out of Eco mode for power-saving purposes.

SLd is the amount of ambient light which will cause the device to move to normal / serving mode from Eco mode (normally occurs in the morning).

SLn is the amount of ambient light which will cause the device to move to Eco mode from normal / serving mode (normally occurs in the evening).

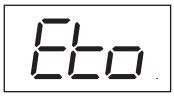
Eco Door Delay / EAd
The transition from Eco to normal mode and vice versa occurs on a change in light level or door activity.

NOTE: *A door sensor is required.*

Eco Light Delay / ELd
This parameter causes a delay to the switch from Normal to Eco mode when the shop lights are switched on or off. The ambient light sensor detects the change in light level and causes a switch mode. With this parameter set to zero, the switch off mode occurs immediately. If not set to zero (max: 10 minutes), then the change will be delayed by the number of minutes set.

Light Blocking delay / Lbd

If the cooler is placed where the ambient light is unstable, the ambient light sensor can cause the cooler to toggle between ECO and normal mode.
The light blocking delay disables the light-sensor for a given time after ambient light change from bright to dark, so that the cooler stays in ECO mode for at least this time. When the cooler is in serving or pull-down mode, the light sensor is de-activated and a change to ECO mode will be determined by the door-sensor.
0: No blocking of the ambient light sensor.



Eco Temperature Offset / Eto

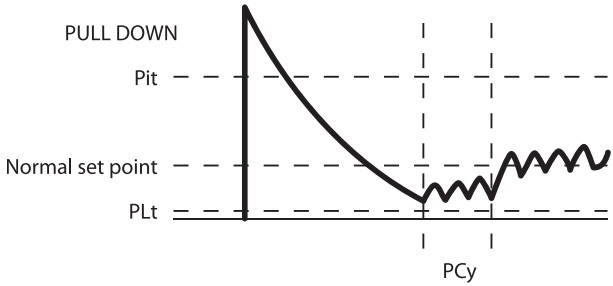
This parameter gives a relative temperature in degrees. It is the difference in temperature for Eco mode operation compared to Normal mode.

NOTE: *Setting a temperature offset may be illegal in some jurisdictions.*

7.7 Pull Down / Pud

Pull down (sometimes known as Super Cool) is a procedure for improving cooling performance, accelerating the time used to reach the desired temperature. Pull Down settings overrule all other settings.

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Pull Down	**Pud**							
Pull-down Initiate Temperature	Pit	50.0/122.0	-40.0/-40.0	50.0/122.0	C/F a	°C/°F	.1	-- -- RW
Pull-down Cycling	PCy	30	0	360	no	min	1	-- -- RW
Pull-down defrost Interval	Pdi	15	0	48	no	hour	1	-- -- RW
Pull-down duration	Pdd	24	0	48	no	hour	1	-- -- RW
Pull-down limit temp	PLt	0.0/32.0	-55.0/-67.0	55.0/131.0	C/F a	°C/°F	.1	-- -- RW
Pull-down reduction temp t	Prt	0.1/0.2	0,0	10.0/16.0	C/F r	K/°R	.1	-- -- RW



Pull Down Initiate Temperature / Pit
This parameter indicates the temperature which causes a pull down to start. If the temperature measured inside the cabinet exceeds this value for longer than one hour, then pull down will start. The compressor will have already cut-in, so the only effect is to stop defrost cycles until the desired temperature is reached. The period of one hour is fixed and cannot be altered.

Pull Down Cycling / PCy
This is the duration in minutes of the compressor cycling at the reduced set point temperature. Once the desired Pull Down Limit Temperature PLt has been reached during Pulldown, the compressor will continue to cycle on / off for the duration of PCy. At the end of the period defined by PCy, the Set Point temperature will return to normal and Pulldown will cease.

Pull Down Defrost Interval / Pdi
Even though most applications do not need Defrost during Pull Down, an extended defrost during pull down can be applied. This is the time between defrost cycles during Pull Down. It is measured in hours and can be up to 48 hours. During Pull Down, this setting overrides the Defrost Interval and Defrost Time settings (see the Defrost section).

Pull Down Duration / Pdd
You can choose to limit the maximum Pull Down time. Once this time value (max. 48 hours) is reached, Pull Down will stop regardless of whether the desired pull-down temperature has been reached.

Pull Down Limit Temperature / PLt
This parameter sets the minimum allowed temperature during pull-down,
In order to protect valuable contents you must always specify the absolute minimum temperature allowed in your application.
For Glass Door Merchandisers 0°C/32°F protects bottles from freezing;
for Commercial Fridges you may opt for a slightly higher temperature (e.g. 2°C)

Pull Down Reduction Temperature Δt / Prt
ERC 102 calculates a lower set-point during Pull Down mode to increase the cooling capacity of your appliance. For each hour the cabinet temperature is above the Pull down initiate temperature, the set-point is reduced with the value of Prt.

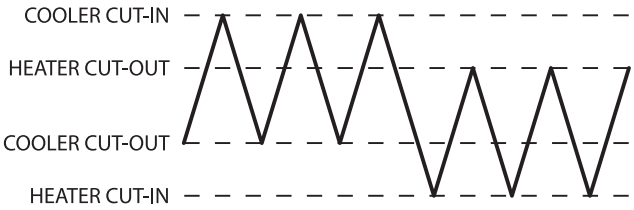
7.8 Automatic Heater Control / AHC

Automatic Heater Control applies reverse cooling mode (heating) to your refrigeration appliance. This feature requires:

A) that your appliance is exposed to ambient temperatures below the desired temperature in your cabinet (e.g. very cold climates and outdoor use)

B) a special heater (for example a large defrost heater) built in to your appliance.

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Auto-Heater Control	**AHC**							
Automatic heater mode enable	AuH	no	no	yES	no			-- -- RW
Energy mode delay	End	60	0	360	no	min	1	-- -- RW
Heater displacement temperature	Hdi	2.0/3.0	0.0/0.0	50.0/90.0	C/F r	K/°R	.1	-- -- RW



Automatic Heater Mode Enable / AuH
This setting is normally set to nO.
When set to yES, parameters End and Hdi apply.

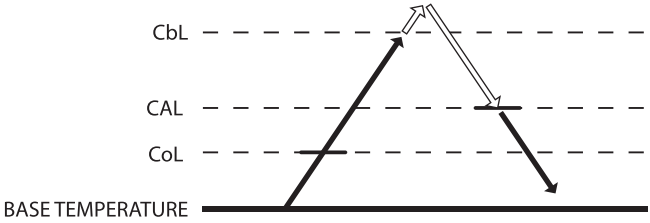
Energy Mode Delay / End
This is the delay in minutes between the heater and the compressor operation. The heater is not allowed to start until this number of minutes has expired after the compressor has cut out and vice versa.

Heater Displacement Temperature / Hdi
This is the temperature relative to (below) the desired temperature.

7.9 Condenser Protection / Con

NOTE: *A condensor temperature sensor is required to use these parameters.*
Condenser protection is generally used in dusty environments where the condenser may accumulate a layer of dust or dirt and therefore be at risk of overheating.

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Condenser Protection	**Con**							
Condenser Alarm Limit	CAL	80/176	0/32	85/185	C/F a	°C/°F	1	-- -- RW
Condenser Block Limit	CbL	85/185	0/32	85/185	C/F a	°C/°F	1	-- -- RW
Condenser OK limit	CoL	60/140	0/32	85/185	C/F a	°C/°F	1	-- -- RW
Condenser Low Limit	CLL	5	-20/-4	20/68	C/F a	°C/°F	1	-- -- RW



Condenser Alarm Limit / CAL
This parameter sets the temperature for the condenser at which an alarm will be generated.

Condenser Block Limit / CbL
This parameter sets the temperature which if reached will cause the compressor to switch off.

Condenser OK Limit / CoL
This parameter sets the temperature at which the compressor is allowed to start again after the temperature set in CbL above has been exceeded and the compressor stopped.

Condenser Low Limit / CLL
This parameter sets the lowest (condenser) temperature at which the compressor is allowed to start.

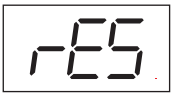
7.10 Display / diS

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Display	**diS**							
Display Unit	CFu	-C	-C	-F	no			RW RW RW
Display Resolution	rES	0.1	0.1	1	no			-- -- RW
Display Range Limit	rlt	no	no	yES	no			-- -- RW
Display Delay	ddL	0	0	10	no	Sec	1	-- -- RW
Display Offset	doF	0.0/0.0	-10.0/-18.0	10.0/18.0	C/F r	K/°R		-- -- RW
Lock-time After defrost	dLt	15	0	60	no	min	1	-- -- RW
Show Economy state	SEC	no	no	yES	no			-- -- RW
Show Pull Down state	SSC	no	no	yES	no			-- -- RW
Show Defrost	SdF	yES	no	yES	no			-- -- RW
Display Intensity	din	10	1	10	no		1	RW RW RW

This section deals with parameters for the display.

NOTE: *Some display parameters can be set in such as way that they may be illegal in some jurisdictions. Please check local legislation.*

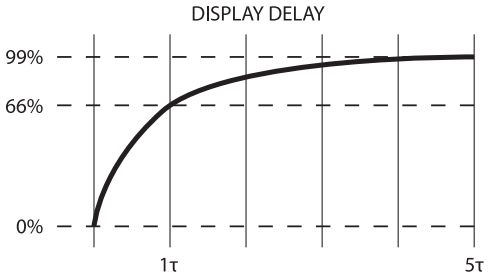
Display Unit / CFu
This parameter sets the display to Fahrenheit or Celsius. Switching from one to the other will cause all temperature settings to be automatically updated accordingly.



Display Resolution / rES
This parameter can be set to 0.1, 0.5 or 1 and affects the way the temperature is displayed. With the parameter set to 1, the display will only ever show temperatures rounded to the nearest whole degree. At 0.5, it will round the temperature to the nearest half degree for display.
For example, 3.3 degrees will be shown in the display as 3.5 degrees and 3.9 as 4.0.
With the parameter set to 0.1, no rounding occurs.
This parameter does **not** affect the temperature itself, merely the display.

Display Range Limit / rLT
In some Point of Sales applications you may want to show the desired instead of the real temperature. This parameter sets whether the displayed temperature is the actual temperature or whether it is restricted to the cut-in / cut-out limits. Set to nO means that the actual temperature will de displayed.
The parameter is set to nO by default.

Display Delay/ ddL
In order to provide a realistic temperature appearance for an application, a display delay can be set.
The parameter sets the time constant τ (tau) of the moving average filter for the display.
Physically, one time constant represents the time it takes the system's step-response to reach 66% of its final value and five time-constants the time it takes to reach 99% of its final value.
The parameter can be set from 0 to 10 minutes.



Display Offset / doF
This parameter is a relative value and allows the temperature displayed to be different to the temperature measured. For instance, at a measured temperature of 7°C and doF set to -2K, the displayed temperature will be 5°C instead.

Lock Time After Defrost / dLt
In order not to show a rising temperature during defrosting, the displayed temperature is locked at the temperature shown at the start of the defrost cycle for the number of minutes set in this parameter.
0 = no lock.

Show Economy State / SEC
If set to yES, this parameter causes the display to show ECO when the system is in ECO mode.
If set to nO, the temperature continues to be displayed.

Show Pull down state / SSC
If set to yES, this parameter causes the display to show SC when the system is in Pull Down mode.
If set to nO, the temperature continues to be displayed.

Show Defrost / SdF
If set to yES, this parameter causes the display to show DEF when the system is in defrost mode. If set to nO, the temperature continues to be displayed.

Display Intensity / din

ERC 102 can have its display intensity (brightness) set in one of two ways:

A) with a Danfoss ambient light sensor attached, the brightness of the display is adjusted automatically according to the ambient light level (see the Assignments section)

B) when no ambient light sensor is attached, the display intensity can be set to a fixed intensity.

Both options are on a scale of 1 to 10, where 10 is the brightest.

7.11 Assignments / ASi

For more details on how to set parameters
- see chapter 6.

	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Assignments	**ASi**							
S1 Config	S1C	Stn	Stn	dig	no			-- -- RW
S2 Config	S2C	Stn	Stn	dig	no			-- -- RW
S3 Config	S3C	Stn	Stn	dig	no			-- -- RW
S1 Application	S1A	SCo	nC	doo	no			-- -- RW
S2 Application	S2A	nC	nC	doo	no			-- -- RW
S3 Application	S3A	nC	nC	doo	no			-- -- RW
DI Config	diC	dio	doC	dio	no			-- -- RW
DO1 Config	o1C	CoP	CoP	HEt	no			-- -- RW
DO2 Config	o2C	dEF	0	Lig	no			-- -- RW
DO3 Config	o3C	FAn	0	Lig	no			-- -- RW
DO4 Config	o4C	Lig	0	Lig	no			-- -- RW
Button 1 Short Config	b1C	noP	tP	noP	no			-- -- RW
Button 1 Long Config	b1L	PoF	tP	PoF	no			-- -- RW
Button 2 Short Config	b2C	dEF	tP	noP	no			-- -- RW
Button 3 Short Config	b3C	tP	tP	noP	no			-- -- RW
Button 3 Long Config	b3L	ECo	tP	PoF	no			-- -- RW
Button 4 Short Config	b4C	tn	tP	noP	no			-- -- RW
Button 4 Long Config	b4L	Lig	tP	PoF	no			-- -- RW
Pass-word level1	PS1	0	0	999	no			RW RW RW
Pass-word level2	PS2	0	0	999	no			-- RW RW
Pass-word level3	PS3	0	0	999	no			-- -- RW
Cabinet Light Control Source	CLC	Lig	Lig	LEC	no			-- -- RW
Door close delay	dCd	0	0	300	no	Sec	1	-- -- RW
Light off delay	Lod	0	0	300	no	Sec	1	-- -- RW

7.12 Service Information / Ser

The parameters in the following section are READ ONLY and cannot be changed by the user. They provide information for technicians and OEM users.

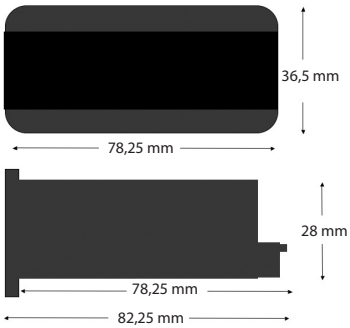
NOTE: *the only parameters that can be configured are: oEL, oEn, oEH.*
These parameters allow OEMs to enter their own product code.

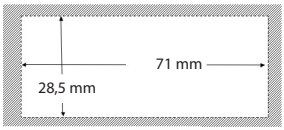
	ERC menu code	Default	Min	Max	Unit Conv	Unit	Scale	Default Access Shop Ser OEM
Service	**SEr**							
DI	Sdi	---	oFF	on	no			-- R- R-
Voltage value	uAC	---	0	270	no	Vac	1	-- R- R-
DOs Status	ouS	---	IIII	IIII	no			-- R- R-
Relay 1 counter	rL1	---	0	999	no	1000	1000	-- R- R-
Relay 2 counter	rL2	---	0	999	no	1000	1000	-- R- R-
Relay 3 counter	rL3	---	0	999	no	1000	1000	-- R- R-
Relay 4 counter	rL4	---	0	999	no	1000	1000	-- R- R-
interval Counter	int	---	0	999	no	min	1	-- R- R-
Defrost time counter	dnt	---	0	999	no	min	1	-- R- R-
Door open counter	ont	---	0	999	no	1	1	-- R- R-
SW version	Fir	SWVER	-32768	32767	no			R- R- R-
HW version	HAr	HWVER	-32768	32767	no			R- R- R-
OrderNoLow	OnL	ORNOL	-32768	32767	no			-- -- --
OrderNoHigh	OnH	ORNOH	-32768	32767	no			-- -- --
OEM code Low	oEL	0	0	999	no			R- R- R-
OEM code Middle	oEn	0	0	999	no			R- R- R-
OEM code High	oEH	0	0	999	no			R- R- R-
Parameter version	PAr	PARVER	-32768	32767	no			R- R- R-
Last change	CHA	0	0	999	no		1	-- -- --
Manufacturing date	CHd	0	0	999	no		1	-- R- R-
Copy Key ID	Cid	0	0	999	no		1	-- -- R-
Set as Default	SFC	no	no	yES	no			RW RW RW

8. TECHNICAL SPECS

Power Supply	100 V AC - 240 V AC, switch mode power supply		
Rated Power	Average 0 7 W		
	4 Inputs: 3 Analogue & Digital, 1 Digital; user specific assignment		
Input	• Air / Evaporator / Condenser	• Door sensor: All types, user specific	
	• Light sensor: Danfoss ECO light sensor	• DP for remote communication	
Output		UL60730	EN60730
	DO1 (Compressor relay):	120 V ac: 16A resistive/ FLA16 / LRA72. 240 V ac: 10A resistive /FLA10 /LRA60.	16(16)A
	DO4	8 A resistive, FLA2/ LRA12, TV-1	8 A resistive, 2(2) A
	DO5	FLA2/ LRA12, TV-1	8 A resistive, 2(2) A
	DO6	FLA2/ LRA12, TV-1	8 A resistive, 2(2) A
			Max 10 A total DO4-6
Probes	Danfoss NTC sensors and Danfoss ECO accessories (300 - 3,000 mm)		
Connectors	Modular connector system for OEM customers, with optional output screw terminal adapter; Input connector type: Rast2 5 Edge connectors; Output connector type: RAST 5 Standard		
Programming	Programming with Danfoss ERC docking station, integrated system		
Assembly	3 types for all controls: Front mounting (patents pending); brackets; fully integrated solution (requires OEM specific design of mounting hole)		
Display	LED display, 3 digit, decimal point and multi functionality icons; °C/F scale		
Keypad	4 buttons (integrated IP65 design), 2 left, 2 right; user programmable		
Operating Conditions	0 °C to 55 °C, 93% rH		
Storage Conditions	-40 °C to 85 °C, 93% rH		
Range of Measurement	-40 °C to 85 °C		
Protection	front: IP65/rear: water and dust protection corresponds to IP31, accessibility of connectors limit rear part rating to IP00		
Environmental	Pollution degree II, non-condensing		
Resistance to heat & fire	Category D (UL94-V0)		
EMC category	Category I		
Operating Cycles	Compressor relay: more than 175,000 at full load (16A(96A))		
Approvals **Note:** These approvals are only valid when using the accessories listed in this document	R290/R600a : EN/IEC 60079-15:2005 Glow wire according to EN/IEC 60335-1 IEC/EN 60730 UL60730 NSF CQC GOST R 60730		

Dimensions:





Front mounting

Rear mounting

APPENDIX I: PARAMETER QUICK LIST

	ERC menu code	Description
Thermostat	**tHE**	**Thermostat settings**
Set point adjustment ratio	SPr	Current setpoint adjustment value diF * SPr
Differential	diF	Thermostat differential
High Set Point	HSE	Upper limit of thermostat set point
Low Set Point	LSE	Lower limit of thermostat set point
Air Temp Adj.	tAd	Applies to non-Danfoss temperature sensors only

	ERC menu code	Description
Alarm	**ALA**	**Alarm settings**
High Alarm delay	Htd	Alarm delay on high temperature
Low Alarm delay	Ltd	Alarm delay on low temperature
High Temp Alarm	HAt	Alarm is activated above this temperature (Celsius)
Low Temp Alarm	LAt	Alarm is activated below this temperature (Celsius)
Pulldown delay	Pdd	Alarm delay during pulldown (0-960 minutes) (high temperature only)
Door Open delay	dod	Alarm delay for door open (0-60 minutes)
Alarm Buzzer Duration	Abd	Alarm buzzer duration in minutes (0=no buzzer)
Auto Clearance of Alarm/Error	ACA	yES: alarm auto-clears if system returns to normal; nO : alarm state maintained regardless

	ERC menu code	Description
Compressor	**CoP**	**Compressor settings**
Min run time	Crt	Minimum time compressor must run 0-30 minutes
Min Stop time	CSt	Min time compressor must idle 0-30 minutes
Max Off time	Cot	Max time compressor must idle 0-480 minutes
Compressor door open delay	Cdd	Minutes before compressor stops when door opened
Error run time	Ert	Compressor run time if temperature sensor is not working (0-60 minutes)
Error stop time	ESt	Compressor stop time if temperature sensor is not working (0-60 minutes)
Minimum Cutin voltage	uLi	When compressor is off: Lowest compressor start voltage (0-270 V)
Minimum cut-out voltage	uLo	When compressor is on: Lowest operation voltage (0-270 V)
Maximum voltage	uHi	When compressor is on: Highest operation voltage (0-270 V)
Power On Delay	Pod	Delay in seconds after power-on before outputs active (change with care)
Power Factor	PFA	Phasic angle in degrees. Changing this may give decreased relay lifetime
Power-on temperature	Pot	If the temperature of compressor at power-on exceeds this then Power On Delay does not apply

	ERC menu code	Description
Defrost	**dEF**	**Defrost Settings**
Def. type	dFt	no: Defrost function is disabled EL: Electrical or time defrost Hgd: Hot gas defrost (contact Danfoss for details) nat:Off-cycle defrost (natural defrost)
Def terminate temp	dtt	Temperature at which defrost cycle will stop
Def Min Interval	dii	The minimum time in hours between the start of each defrost cycle
Def Max Interval	dAi	The maximum time in hours between the start of each defrost cycle
Def Min Time	dit	The minimum duration of a defrost cycle in minutes
Def Max time	dAt	The maximum duration of a defrost cycle in minutes
Drip off time	dot	The duration in minutes of the drip-off time at the end of a defrost cycle
Fan delay after Defrost	Fdd	The duration in minutes before the fan starts after a defrost cycle
Fan start Temp	Ftd	The temperature at which the fan will start after a defrost
Defrost Fan on	dFA	Whether the fan will run during a defrost cycle
Initial Defrost Interval	idi	The number of hours after power-up before the first defrost cycle starts
Defrost on compressor time	dCt	Whether the defrost cycles are measured by elapsed time (nO) or compressor run time (yES)

	ERC menu code	Description
Fan	**FAn**	**Fan settings**
Fan always On	FAo	nO: fan parameters below active. yES: Fan is always on
Fan On Delay	Fod	Delay in seconds before fan starts after compressor starts
Fan Stop delay	FSd	Delay in seconds before fan stops after compressor stops
Fan On Cycle	FoC	The number of seconds the fan runs when the compressor is off
Fan Stop Cycle	FSC	The number of seconds the fan does not run when the compressor is off

	ERC menu code	Description
Energy management	**Eng**	**Energy Management**
Shop Light Day	SLd	When ambient light is above this level, Eco mode is cancelled. Requires light sensor
Shop Light Night	SLn	When ambient light is below this level, Eco mode is enabled. Requires light sensor
Eco Activity delay	EAd	Minutes delay after last door opening until ECO mode is enabled; 0: disable
Eco Light delay	ELd	Delay [min] between detection of shop light on/off and ECO mode activation / suspension
Eco Temperature Offset	Eto	Temperature increase for Eco mode relative to normal mode

	ERC menu code	Description
Pull Down	**Pud**	**Pull down settings**
Pull-down Initiate Temperature	Pit	If the cabinet temperature is above this temperature for >1h, pull-down mode is activated
Pull-down Cycling	PCy	Minimum duration [min] of the pull-down mode, starting at PiT
Pull-down defrost Interval	Pdi	Defrost interval during pull-down. Over-rules the defrost interval in normal mode.
Pull-down duration	Pdd	Maximum duration [min] of the pull-down mode, starting at PiT
Pull-down limit temp	PLt	A safety feature; the lowest temperature allowed during pull-down.
Pull-down reduction temp Δt	Prt	A calculation value for pull-down performance improvement. Instructions: See manual

	ERC menu code	Description
Auto-Heater Control	**AHC**	**Auto-Heater settings (only if heater fitted for outdoor use in cold climates)**
Automatic heater mode enable	AuH	yES: Activate heater if ambient temperature is below desired cabinet temperature
Energy mode delay	End	Delay in minutes between heater and compressor operation
Heater displacement temperature	Hdi	Heater displacement or OFFSET temperature relative to desired temperature.

	ERC menu code	Description
Condenser Protection	**Con**	**Condenser protection settings**
Condenser Alarm Limit	CAL	If condenser sensor exceeds this temperature, alarm is activated
Condenser Block Limit	CbL	If this temperature is exceeded, compressor will be stopped.
Condenser OK limit	CoL	Temperature at which compressor may start after a stop due to exceeding CbL
Condenser Low Temp. Limit	CLL	Temperature below which the compressor is not allowed to start

	ERC menu code	Description
Display	**diS**	**Display settings**
Display Unit	CFu	F: Fahrenheit; C: Celsius
Display Resolution	rES	Display resolution for temp: 0.1, 0.5 or 1.0 C/F
Display Range Limit	rlt	Limits displayed temperature to actual setpoint +/- differential; may be illegal in some countries
Display Delay	ddL	Time period for moving average temperature display
Display Offset	doF	Display a different temperature relative to measured temperature
Lock-time After defrost	dLt	Display lock time after defrost [0-60 min]
Show Economy state	SEC	yES: display will show "Eco" when in Eco mode. nO: temperature will be shown
Show Pull Down state	SSC	yES: "SC " will be displayed during Pull down; nO: "SC " will not be displayed.
Show Defrost	SdF	yES: display will show deF during defrost ; no: Display will show temp
Display Intensity	din	Display intensity when no ambient sensor; min intensity with sensor

	ERC menu code	Description
Assignments	**ASi**	**Assignment of inputs and outputs**
S1 Config	S1C	Sensor type input 1 :Stn: Standard NTC 5k @25°C (EKS211); Ldr: Light sensor; dig: binary input
S2 Config	S2C	Sensor type input 2 :Stn: Standard NTC 5k @25°C (EKS211); Ldr: Light sensor; dig: binary input
S3 Config	S3C	Sensor type input 3 :Stn: Standard NTC 5k @25°C (EKS211); Ldr: Light sensor; dig: binary input
S1 Application	S1A	Application to be controlled with Sensor D. nC: Not connected SCo: Temperature control EuA: Evaporator temperture Con: Condenser temperature (Condenser cleaning) LS1: Light sensor(Ldr), Luminens, delicated for Economy detection LS2: Light sensor(Ldr), Luminens, delicated for LED intensity scope LS3: Light sensor(Ldr), Luminens, delicated for both Economy detection and LED intensity scope doC: Door contact, Contact closed when door closed doo: Door contact, Contact open when door closed
S2 Application	S2A	Application to be controlled with Sensor C. nC: Not connected SCo: Temperature control EuA: Evaporator temperture Con: Condenser temperature (Condenser cleaning) LS1: Light sensor(LDR), Luminens, delicated for Economy detection LS2: Light sensor(LDR), Luminens, delicated for LED intensity scope LS3: Light sensor(LDR), Luminens, delicated for both Economy detection and LED intensity scope doC: Door contact, Contact closed when door closed doo: Door contact, Contact open when door closed
S3 Application	S3A	Application to be controled with Sensor B. nC: Not connected SCo: Temperature control EuA: Evaporator temperture Con: Condenser temperature (Condenser cleaning) LS1: Light sensor(LDR), Luminens, delicated for Economy detection LS2: Light
DI Config	diC	Sensor A (digital) doC: Door contact, Contact closed when door closed doo: Door contact, Contact open when door closed dio: One wire digital communication buS: MODBUS communication
DO1 Config	o1C	CoP: Compressor; PiL: Pilot Relay (No zero-cross); HEt: Inverse output, Heating application
DO2 Config	o2C	no:Not used; dEF: Elec defr heater/hot gas valve;ALA:Alarm output;FAn:Fan control;Lig:Light control
DO3 Config	o3C	nO: Not used; ALA: Alarm output; FAn: Fan control; Lig: Light control
DO4 Config	o4C	nO: Not used; ALA: Alarm output; Lig: Light control
Button 1 Config	b1C	Lower left button configuration. tP:Increase Setpoint tn: Decrease setpoint ECo: Toggle Eco mode Lig: Toggle light dEF: Toggle defrost SuP: Activate Super-Cool /Pull-down diP : Increase display intensity din : Decrease display intensity noP: Not operating

	ERC menu code	Description
Assignments	**ASi**	**Assignment of inputs and outputs**
Button 2 Config	b2C	Upper left button configuration. tP:Increase Setpoint tn: Decrease setpoint ECo: Toggle Eco mode Lig: Toggle light dEF: Toggle defrost SuP: Activate Super-Cool /Pull-down diP : Increase display intensity din : Decrease display intensity noP: Not operating
Button 3 Config	b3C	Upper right button configuration. tP:Increase Setpoint tn: Decrease setpoint ECo: Toggle Eco mode Lig: Toggle light dEF: Toggle defrost SuP: Activate Super-Cool /Pull-down diP : Increase display intensity din : Decrease display intensity noP: Not operating
Button 4 Config	b4C	Lower right button configuration. tP:Increase Setpoint tn: Decrease setpoint ECo: Toggle Eco mode Lig: Toggle light dEF: Toggle defrost SuP: Activate Super-Cool /Pull-down diP : Increase display intensity din : Decrease display intensity noP: Not operating
Pass-word level1	PS1	Level 1 Password (End user, shop owner), 0= disabled
Pass-word level2	PS2	Level 2 Password (Technical field service), 0= disabled
Pass-word level3	PS3	Level 3 Password (OEM), 0= disabled; choose a secure number, e.g. 735
Cabinet Light Control Source	CLC	Cabinet light management Lig: button only" Ldo: door (and button if defined) only LEC: Economy (and button if defined) only
Light off delay	Lod	Light off delay [sec] after door has been closed

	ERC menu code	Description
Service	SEr	**Service**
DI	Sdi	DI: physcial DI pin state (ON; OFF)
Voltage value	uAC	Current main power supply voltage
DOs Status	ouS	Current relay open / closed status. IIII = All Relay on (Upper bar for on, Lower bar for off) II = DO1 On, DO2 Off, DO3 & DO4 NA (No bar if relay not mounted) IIII = All Relay off (Upper bar for on, Lower bar for off)
Relay 1 counter	rL1	Thousands of cycles of compressor relay since manufacture
Relay 2 counter	rL2	Thousands of cycles of no.2 relay since manufacture
Relay 3 counter	rL3	Thousands of cycles of no. 3 relay since manufacture
Relay 4 counter	rL4	Thousands of cycles of no. 4 relay since manufacture
interval Counter	int	Compressor run time since last defrost
Defrost time counter	dnt	Duration of last defrost cycle [min]
Door open counter	ont	ont/100 = Number of door openings since last reset
Serial numbe	Snu	Serial number given at manufacturing
SW version	Fir	Danfoss software version number
HW version	HAr	Danfoss hardware version number
OrderNoLow	OnL	Danfoss order code number
OrderNoHigh	OnH	Danfoss order code number
Parameter version	PAr	OEM parameter version number [requires EKA copy key update]
Last change	CHA	Not used
Manufacturing date	CHd	Programme date WWY: week number and year number (2010-19)
Copy Key ID	Cid	Copy key used for last program
Set as Default	SFC	Resets all parameters to last good OEM settings

APPENDIX II: CODE NUMBERS AND LENGHTS

Type	Code no. I-Pack Approvals 230V, CQC/UL/CE
GDM-front	
ERC 102C RED LED without buzzer	**080G3102**
ERC 102D RED LED without buzzer	**080G3103**
ERC 102C BLUE LED without buzzer	**080G3106**
ERC 102D BLUE LED without buzzer	**080G3107**
CFF-front	
ERC 102C RED LED with buzzer	**080G3113**
ERC 102D RED LED with buzzer	**080G3112**
ERC 102C BLUE LED with buzzer	**080G3116**
ERC 102D BLUE LED with buzzer	**080G3117**
Light-sensors	
Light sensor, 1000 mm (C3), 3-pole	**080G3311**
Light sensor, 2000 mm (C3), 3-pole	**080G3313**
Light sensor, 3000 mm (C3), 3-pole	**080G3315**
Door-sensors	
Door-sensor, 1000 mm (C4), 3-pole	**080G3332**
Door-sensor, 2000 mm (C4), 3-pole	**080G3334**
Door-sensor, 3000 mm (C4), 3-pole	**080G3336**
Temperature sensors	
PVC Standard (C1), 470 mm, 3-pole	**077F8751**
PVC Standard (C1), 1000 mm, 3-pole	**077F8757**
PVC Standard (C1), 1500 mm, 3-pole	**077F8761**
PVC Standard (C1), 2000 mm, 3-pole	**077F8765**
PVC Standard (C1), 2200 mm, 3-pole	**077F8767**
PVC Standard (C1), 3000 mm, 3-pole	**077F8769**

Note: For more information about temperature sensor types and connectors, please refer to Danfoss' technical brochure "NTC type temperature sensors for ETC & ERC controllers"

Type	Code no. I-Pack Approvals 230V, CQC/UL/CE
Defrost sensors*	
PVC Standard (C2), 470 mm, 2-pole	**077F8780**
PVC Standard (C2), 1000 mm, 2-pole	**077F8786**
PVC Standard (C2), 1500 mm, 2-pole	**077F8790**
PVC Standard (C2), 2000 mm, 2-pole	**077F8794**
PVC Standard (C2), 3000 mm, 2-pole	**077F8798**
PVC Standard (C3), 470 mm, 3-pole	**077F8750**
PVC Standard (C3), 1000 mm, 3-pole	**077F8756**
PVC Standard (C3), 1500 mm, 3-pole	**077F8760**
PVC Standard (C3), 2000 mm, 3-pole	**077F8764**
PVC Standard (C3), 2200 mm, 3-pole	**077F8766**
PVC Standard (C3), 3000 mm, 3-pole	**077F8768**
Other sensors	
TPFE low temp (C1), 1000 mm, 3-pole	**077F8657**
TPFE low temp (C1), 2000 mm, 3-pole	**077F8665**
TPE precision (C1), 500 mm, 3-pole	**077F8724**
TPE precision (C1), 1000 mm, 3-pole	**077F8725**
TPE precision (C1), 1500 mm, 3-pole	**077F8726**
TPE precision (C1), 2000 mm, 3-pole	**077F8727**
TPE precision (C1), 2500 mm, 3-pole	**077F8728**
TPE precision (C1), 3000 mm, 3-pole	**077F8729**
Clamps	
Black (2 needed per controller)	**080G3308**
Programming	
OEM Docking station, production line	**080G9701**
Gateway incl USB Cable, R&D	**080G9711**
Copy Stick EKA-183A	**080G9740**

C: connector type

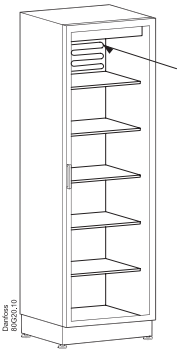
** Defrost sensors can also be used as condenser sensors. .*

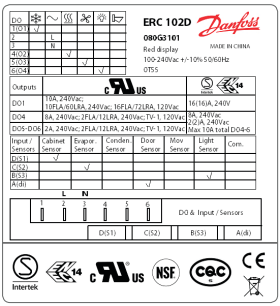
APPENDIX III: TROUBLESHOOTING

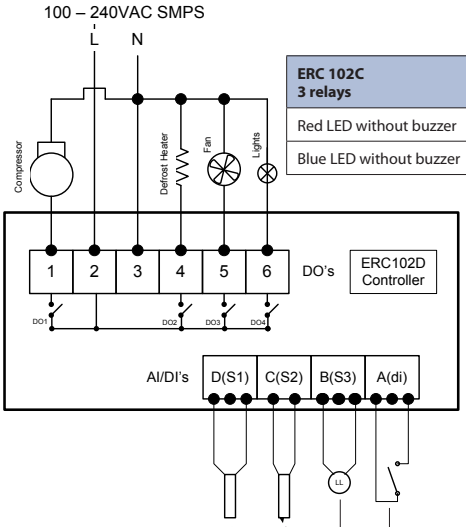
Problem	Probable cause	Remedy
Compressor does not start	Waiting for compressor delay timer Defrost in progress Line voltage to compressor too low or too high	Check CoP->CSt Check CoP ->Pot /Pod Check dEF ->dit, dot Check CoP->uLi, uLo, uHi
Fan does not start	Door is open or door contact is defective	Fan stops when door is opened Check that door contact is ok
Defrost does not start	Controller in pull-down mode	Defrost might be delayed during pull-down Check parameter Pud->Pdi
Alarm does not sound	Alarm delayed	Check ALA->Htd, Abd Check Pud->Pdd
Display brightness is weak	Ambient light sensor broken	Replace sensor
Shift between Eco and Normal mode does not happen on ambient light change	Ambient light sensor broken or light level not set properly	Check Eng->SLd, SLn
E01, E02 or E03 is shown on display	E01: Sensor S1 defective E02: Sensor S2 defective E03: Sensor S3 defective	Replace sensor
Display alternates between Con and temperature	Condenser too hot	Clean condenser Check Con ->CAL, CbL
Display alternates between Hi and temperature	Temperature too high	Check ALA->HAt
Display alternates between Lo and temperature	Temperature too low	Check ALA -> LAt
Display shows dEf	Defrost in progress	Check diS ->SdF

APPENDIX IV: TYPICAL APPLICATIONS – WIRING DIAGRAMS

IV.1 ERC 102D
Glass Door Merchandiser
No-frost freezer / sub-zero cooler







ERC 102C 3 relays	
Red LED without buzzer	**080G3101**
Blue LED without buzzer	**080G3106**

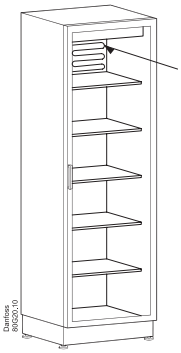
Temperature Sensor for Cabinet Temperature Control	
PVC Standard Connector type (C1) 3-pole	
470 mm	**077F8751**
1000 mm	**077F8757**
1500 mm	**077F8761**
2000 mm	**077F8765**
2200 mm	**077F8767**
3000 mm	**077F8769**

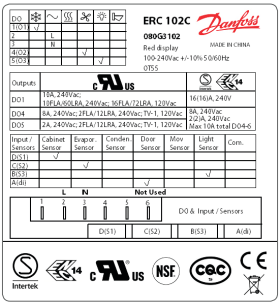
Temperature Sensor for Evaporator Temperature Control	
PVC Standard Connector type (C2) 2-pole	
470 mm	**077F8780**
1000 mm	**077F8786**
1500 mm	**077F8790**
2000 mm	**077F8794**
3000 mm	**077F8798**

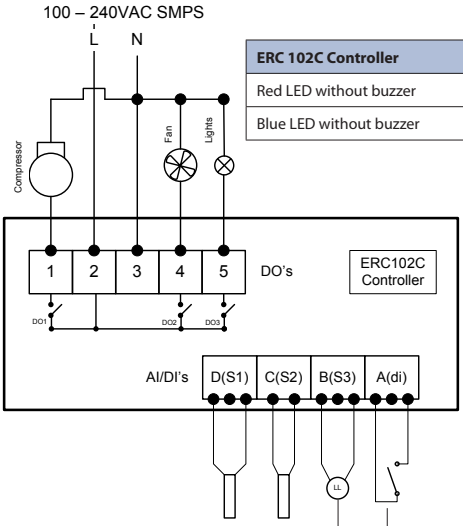
Ambient Light	
Light sensor Connector type (C3) 3-pole	
1000 mm	**080G3311**
2000 mm	**080G3313**
3000 mm	**080G3315**

Door input	
Door-sensor cable Connector type (C4) 3-pole	
1000 mm	**080G3332**
2000 mm	**080G3334**
3000 mm	**080G3336**

IV.2 ERC 102C
Glass Door Merchandiser







ERC 102C Controller	
Red LED without buzzer	**080G3102**
Blue LED without buzzer	**080G3106**

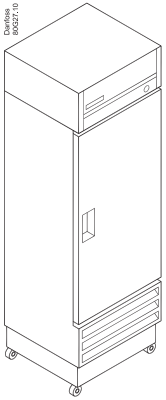
Temperature Sensor for Cabinet Temperature Control	
PVC Standard Connector type (C1) 3-pole	
470 mm	**077F8751**
1000 mm	**077F8757**
1500 mm	**077F8761**
2000 mm	**077F8765**
2200 mm	**077F8767**
3000 mm	**077F8769**

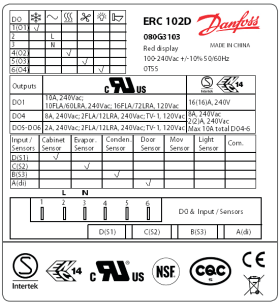
Temperature Sensor for Evaporator Temperature Control	
PVC Standard Connector type (C2) 2-pole	
470 mm	**077F8780**
1000 mm	**077F8786**
1500 mm	**077F8790**
2000 mm	**077F8794**
3000 mm	**077F8798**

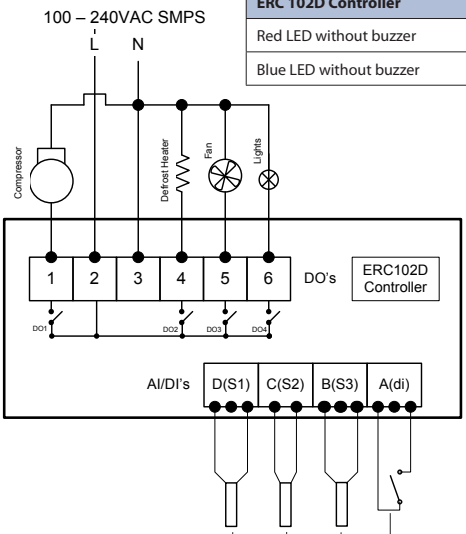
Ambient Light	
Light sensor Connector type (C3) 3-pole	
1000 mm	**080G3311**
2000 mm	**080G3313**
3000 mm	**080G3315**

Door input	
Door-sensor cable Connector type (C4) 3-pole	
1000 mm	**080G3332**
2000 mm	**080G3334**
3000 mm	**080G3336**

IV.3 ERC 102D
Gastro No-frost freezer







ERC 102D Controller	
Red LED without buzzer	**080G3103**
Blue LED without buzzer	**080G3107**

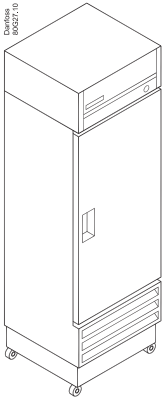
Temperature Sensor for Cabinet Temperature Control	
PVC Standard Connector type (C1) 3-pole	
470 mm	**077F8751**
1000 mm	**077F8757**
1500 mm	**077F8761**
2000 mm	**077F8765**
2200 mm	**077F8767**
3000 mm	**077F8769**

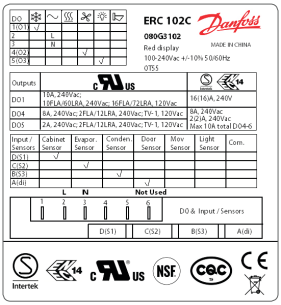
Temperature Sensor for Evaporator Temperature Control	
PVC Standard Connector type (C2) 2-pole	
470 mm	**077F8780**
1000 mm	**077F8786**
1500 mm	**077F8790**
2000 mm	**077F8794**
3000 mm	**077F8798**

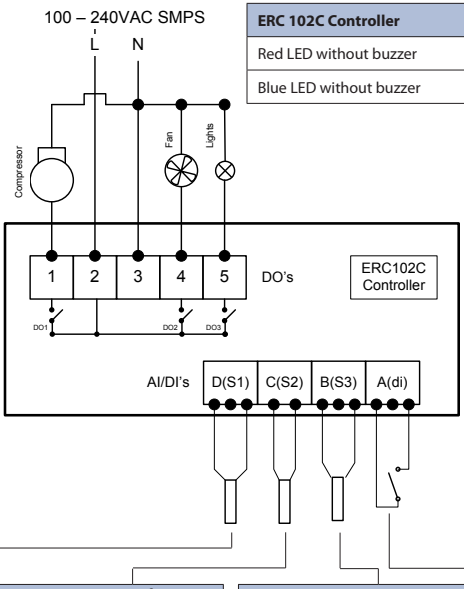
Temperature Sensor for Condenser Temperature Control	
PVC Standard Connector type (C3) 3-pole	
470 mm	**077F8750**
1000 mm	**077F8756**
1500 mm	**077F8760**
2000 mm	**077F8764**
2200 mm	**077F8766**
3000 mm	**077F8768**

Door input	
Door-sensor cable Connector type (C4) 3-pole	
1000 mm	**080G3332**
2000 mm	**080G3334**
3000 mm	**080G3336**

IV.4 ERC 102C
Gastro Cooler







ERC 102C Controller	
Red LED without buzzer	**080G3102**
Blue LED without buzzer	**080G3106**

Temperature Sensor for Cabinet Temperature Control	
PVC Standard Connector type (C1) 3-pole	
470 mm	**077F8751**
1000 mm	**077F8757**
1500 mm	**077F8761**
2000 mm	**077F8765**
2200 mm	**077F8767**
3000 mm	**077F8769**

Temperature Sensor for Evaporator Temperature Control	
PVC Standard Connector type (C2) 2-pole	
470 mm	**077F8780**
1000 mm	**077F8786**
1500 mm	**077F8790**
2000 mm	**077F8794**
3000 mm	**077F8798**

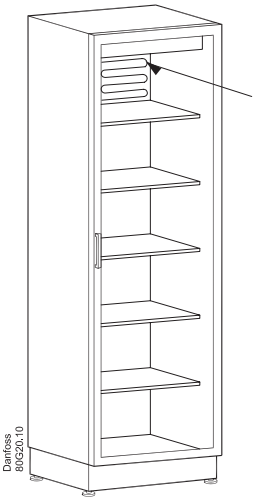
Temperature Sensor for Condenser Temperature Control	
PVC Standard Connector type (C3) 3-pole	
470 mm	**077F8750**
1000 mm	**077F8756**
1500 mm	**077F8760**
2000 mm	**077F8764**
2200 mm	**077F8766**
3000 mm	**077F8768**

Door input	
Door-sensor cable Connector type (C4) 3-pole	
1000 mm	**080G3332**
2000 mm	**080G3334**
3000 mm	**080G3336**

Note: This is a typical (default) wiring diagram since both inputs(AI/DI's) and outputs (DO's) can be assigned differently. Please see manual for further details, folder "ASi", Assignment.

APPENDIX V: APPLICATION SPECIFICATON

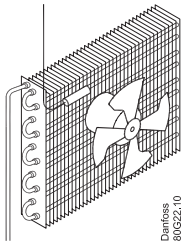
V.1 Control sensor



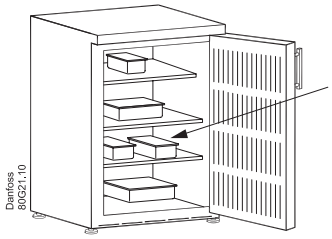
The control sensor must always be connected and is used for controlling the cut-in and cut-out of the compressor according to the set-point. The sensor is also used for the displayed temperature.

Placement of sensor:

Vertical coolers with fan
Most common placement is in the return air to the evaporator. The sensor can be placed close to the fan – even when the fan is pulsed during compressor off periods: The updating of the temperature is blocked when the fan is stopped and only updated when the fan has been running for a while, so that the heat from the fan does not affect the temperature reading.
For applications sensitive to sub-zero temperatures, sensor placement in the evaporator outlet air can be considered.

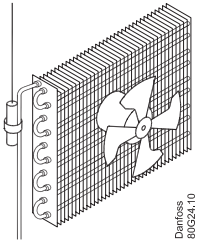


Vertical freezers with fan
Placement in the return air or in the freezer compartment



Coolers without fan
the best results are normally obtained when the sensor is placed at the side-wall, 10 cm from the back and approximately at 1/3 from the bottom or where the evaporator ends.
The control sensor must always be connected and is used for controlling the cut-in and cut-out of the compressor according to the set-point. The sensor is also used for the displayed temperature.

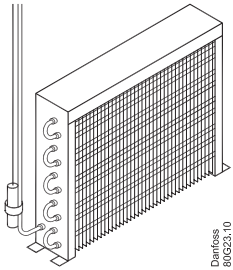
V.2 Evaporator sensor



The evaporator sensor is only used for de-icing of the evaporator and has no control purpose.

Placement of sensor:
Place the sensor where the ice melts last.
Please be aware of that sharp finns can damage the cable.

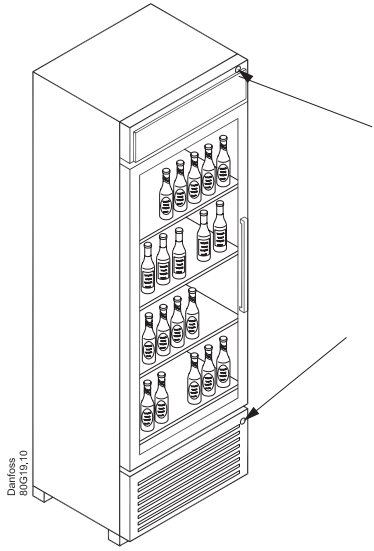
V.3 Condenser sensor



The condenser sensor is used to protect the compressor against high pressure when the condenser is blocked or the condenser fan fails.

Placement of sensor:
Place the sensor at the liquid side of the condenser. Use a metal bracket or metal tape to ensure good thermal conductivity. Be sure that the cable does not pass hot spots at the compressor or condenser that exceeds 80°C.

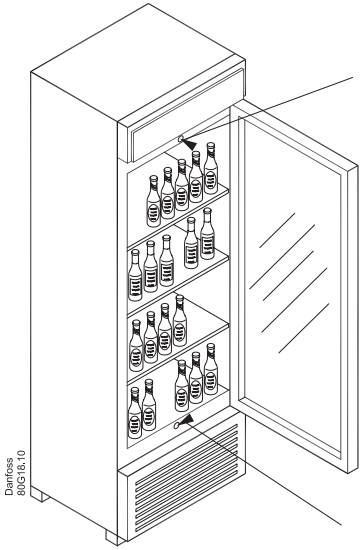
V.4 Ambient light sensor



The ambient light sensor is used to detect opening hours of the shop.

Placement of sensor:
The sensor must be placed so that the interior light does not affect the sensor.
Possible placement could be in the front of the cooler or at the top.

V.5 Door sensor



The door sensor is used to detect buying activity and to stop the fan when the door is opened.

Danfoss does not supply the door-switch. Use the door-switch you have and connect it to the cable supplied by Danfoss.

ERC102 Application Matrix

Application	ERC type	Output				Input			
		DO1	DO2	DO3	DO4	S1 (C1)	S2 (C2)	S3 (C3)	Di (C4)
Standard Beverage cooler	ERC102C	Comp	Fan	Lamp		Control	Defrost	Condenser or Ambient Light	Door
Sub-zero beverage cooler	ERC102D	Comp	Heater	Fan	Lamp	Control	Defrost	Condenser or Ambient Light	Door
Out-door beverage cooler	ERC102D	Comp	Heater	Fan	Lamp	Control	Condenser	Ambient Light	Door
Nofrost freezer w. glassdoor	ERC102D	Comp	Heater	Fan	Lamp	Control	Evaporator	Condenser or Ambient Light	Door
CFF Refrigerator	ERC102C	Comp	Fan	Lamp		Control	Defrost	Condenser	Door
CFF Freezer	ERC102D	Comp	Heater	Fan	Lamp	Control	Defrost	Condenser	Door

C: connector type

NOTE:

- *Select only one function per input, e.g. condenser sensor or ambient light sensor.*
- *Make sure that the accessory you select has a matching connector to the input, e.g. a sensor for input S2 must have C2 connector.*
- *Condenser sensor or light sensor are optional and can be omitted.*
- *Defrost sensor is mandatory when electrical heater is used for defrost. For natural defrost it can be omitted.*