Danfoss ERC 211 Electronic Refrigeration Control Installation Guide

Danfoss ERC 211 Electronic Refrigeration Control

Contents

Introduction

The ERC 211 is a smart multipurpose

refrigeration controller with temperature and defrost management, available with 1 relay.
The controller has been designed to fulfill today’s requirements of commercial refrigeration applications.

Technical Highlights

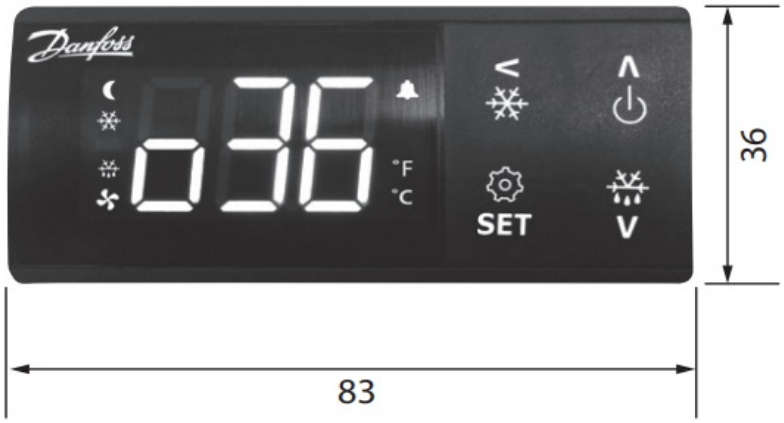
- Ease of use: Four buttons, easy menu structure, pre installed application solutions ensure superior usability.
- Simple installation: High performance 16 A relay enable direct connection of heavy loads, such as 2 hp compressors, without use of intermediate relays. A wide range of compatible types of sensors and screw connection terminals ensure high flexibility in installation.
- Unit protection: Special software features like compressor protection from fluctuation in power supply or from high condensing temperature ensure the safety operation of the unit.
- Energy efficiency: Defrost on demand and day/night mode ensure energy efficiency

User Interface

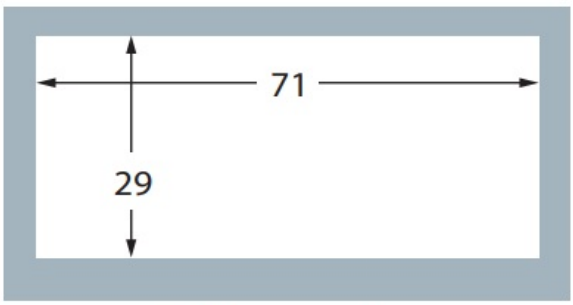
Key Function	
	Scroll up: Short press (less than 1 second). Main switch ON/OFF: Press and hold (~ 3 seconds). Factory reset: Press and hold at Power up.
	Scroll down: Short press (less than 1 sec.) Defrost Start/Stop: Press and hold (~3 secs.)
	Back function: Short press (less than 1 sec.) Pull down start / stop: Press and hold (~3 secs.)
	Set point change or OK: Short press (less than 1 sec.) Enter Menu: Press and hold (~ 3 secs.)

Key Function	
	Night mode (Energy saving)
	Compressor running (Flashes in pull-down mode)
	Active alarm
	Defrost
	Unit (°C or °F)

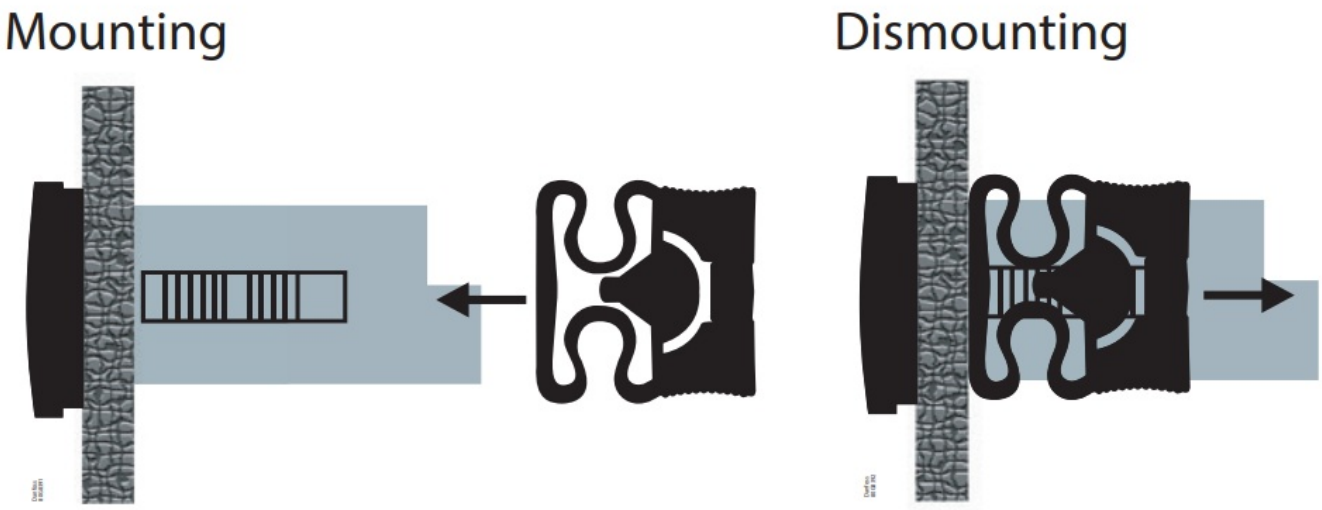
Dimensions (mm) and Mounting



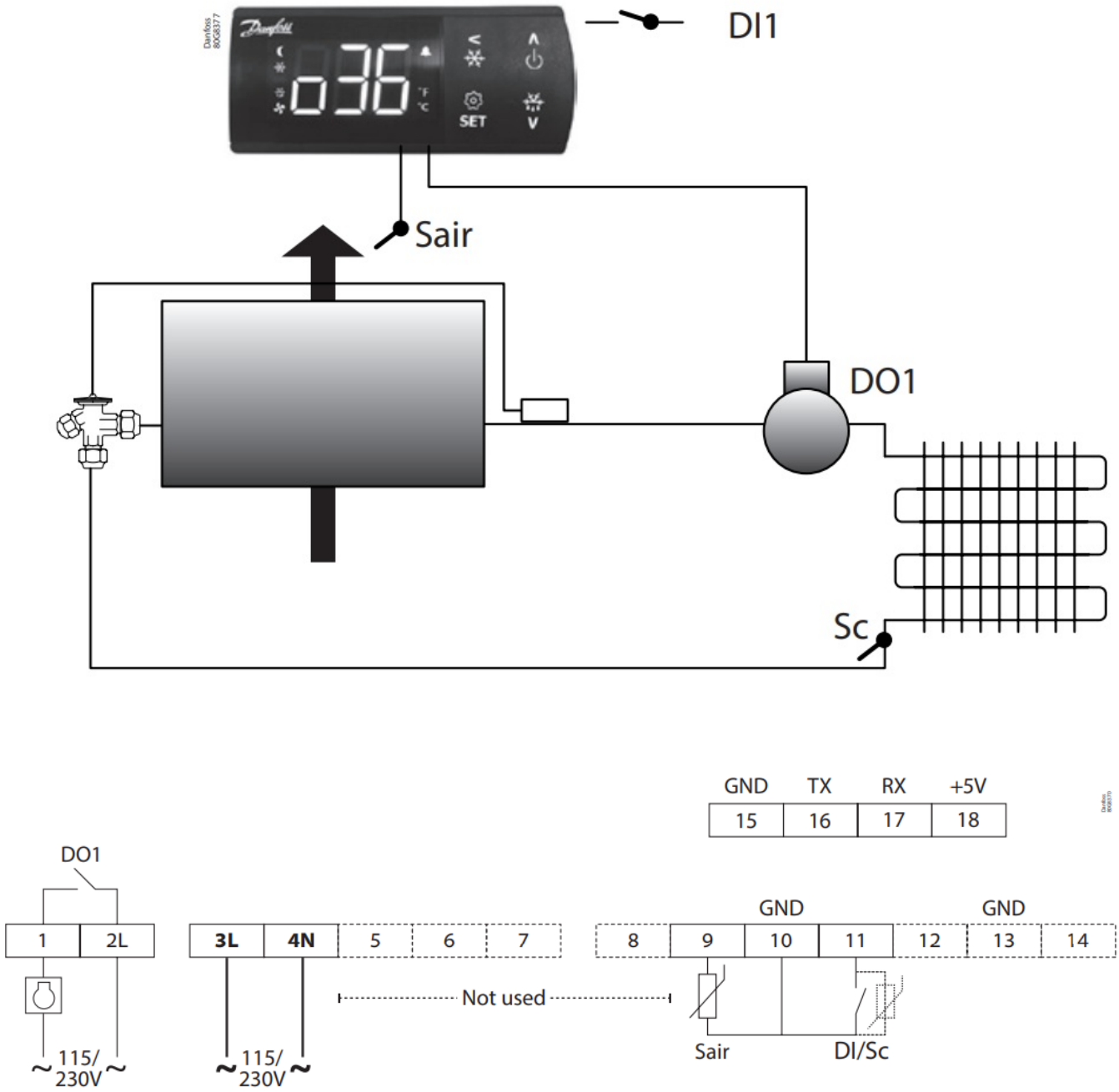
Rear mounting (lock with clips)



Drilling template



Electrical Connections



Note: 2L and 3L must be connected to the same phase. Power connectors: wire size = 0.5 – 1.5 mm2 , max. tightening torque = 0.4 Nm Low voltage signal connectors: wire size = 0.15 – 1.5 mm2 , max. tightening torque = 0.2 Nm

Quick Configuration At Power Up

- STEP 1: power on
- STEP 2: select the quick configuration menu Within 30 seconds of power on, press “<” BACK for 3 seconds. The main switch “r12” is automatically set to OFF.
- STEP 3: select pre-installed application o61 The display automatically shows the application selection parameter “o61”. Press SET to select the pre-installed application. The display shows the default value (eg. “AP0” flashing). Choose the application type by pressing UP/DOWN and press SET to confirm. The controller presets parameter values according to the selected application and does not hide relevant parameters. Tip: you can easily move from AP0 to AP5, and thus select the simplified list of parameters, by pressing the UP key (circular list).

- STEP 4: select sensor type “o06 The display automatically shows sensor selection parameter “o06”. Press SET to select the sensor type. The display shows the default value (eg. “n10” flashing).
  Choose sensor type by pressing UP/DOWN (n5=NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000) and press SET to confirm.
  Note: All sensors must be the same type.

APP	**Description**	**Temp. range**	**Defrost end**		**DO1**	**AI1**
				DI1(1)		
AP 0	Fully Configurable Standard Application (Cooling / Heating)					
AP 1	MT, No defrost	4 – 20 °C	NA		Sair	DI1
AP 2	MT, Natural defrost	2 – 6 °C	Time		Sair	DI1
AP 3	MT, Natural defrost, defrost sto p by Sair	2 – 6 °C	Sair temp		Sair	DI1
AP 4	Heating Thermostat	30 – 70 °C	NA		Sair	DI1
AP 5	Fully configurable simplified application (Cooling / Heating)					

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AP 0	Fully Configurable Standard Application (Cooling / Heating)					
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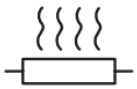
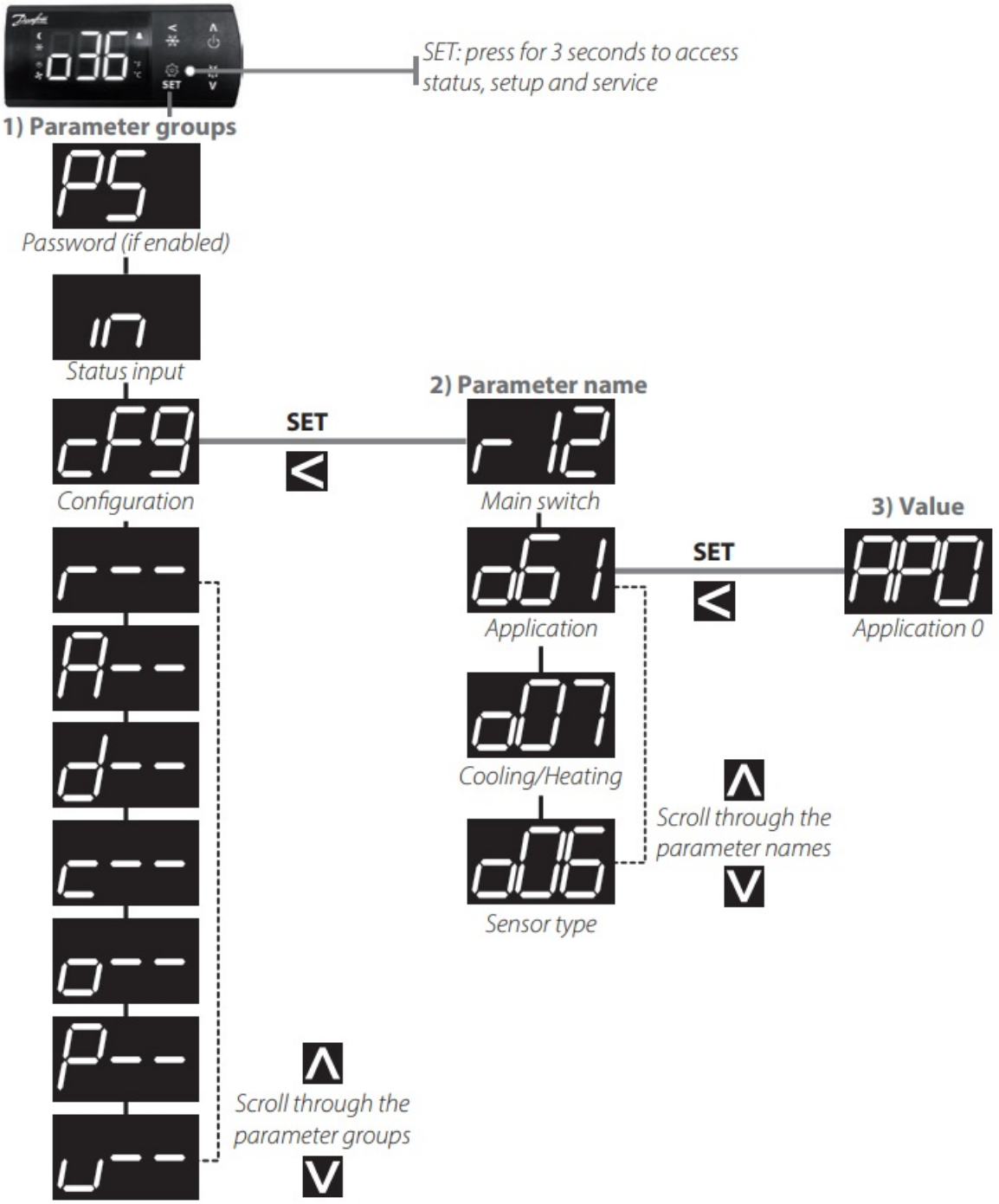
AP 3	MT, Natural defrost, defrost sto p by Sair	2 – 6 °C	Sair temp		Sair	DI1
AP 4	Heating Thermostat	30 – 70 °C	NA		Sair	DI1
AP 5	Fully configurable simplified application (Cooling / Heating)					

(1) The digital inputs DI1 can be configured for multiple functions (refer parameter “o02”).



Quick Configuration via “cFg” Menu

1. Press “SET” button for 3 seconds to access the parameter menu (display will show “cFg”).
2. Enter “CFg” menu by pressing “SET” button (diaplay will show first parameter “r12” main switch.
3. Select “r12” by pressing “SET” button again and set the main switch to “oFF” (r12=0).
4. Press back button (<) to come back to ‘CFg” menu.
5. Press DOWN button to scroll through the “cFg” menu parameter list.
6. Open the “o61 application mode” and select needed application mode (Press SET).
7. Open the “o07 Cooling/Heating” and select needed function and press”SET” (applicable only for AP0 and AP5).
8. Open the “o06 Sensor type” and select the temperature sensor type used (n5=NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000)- (Press “SET”).

9. Open the “o02 DI1 Configuration” and select the function associated to digital input 1 (Press “SET”).
10. Navigate back to parameter “r12 Main switch” and set it in “ON” position to start control.
11. Go through other parameters default settings and change wherever needed.

Technical Specifications

Features	Description
Purpose of control	Operating temperature sensing control suitable for incorporation into commercial air- conditioning and refrigeration applications
Construction of control	Incorporated control
Power supply	115 V AC / 230 V AC 50/60 Hz, galvanic isolated low voltage regulated power supply
Rated power	Less than 0.7 W
Inputs	Sensor inputs, Digital inputs, Programming key Connected to SELV limited energy <15 W
Allowed sensors types	NTC 5000 Ohm at 25 °C, (Beta value=3980 at 25/100 °C – EKS 211) NTC 10000 Ohm at 25 °C, (Beta value=3435 at 25/85 °C – EKS 221) PTC 990 Ohm at 25 °C, (EKS 111) Pt1000, (AKS 11, AKS 12, AKS 21)
Sensors included in Kit Solution	NTC 10000 Ohm at 25 °C, cable length: 1.5 m
Accuracy	Measuring range: -40 – 105 °C (-40 – 221 °F)
	Controller accuracy: ±1 K below -35 °C, ±0.5 K between -35 – 25 °C ±1 K above 25 °C
Type of action	1B (relay)
Output	DO1 Compressor relay: 16 A, 16 (16) A, EN 60730 10 FLA/60 LRA at 230 V, UL60730 16 FLA/72 LRA at 115 V, UL60730
Display	LED display, 3 digits, decimal point and multi- function icons, °C + °F scale
Operating conditions	-10 – +55 °C (14 – 131 °F), 90% Rh
Storage conditions	-40 – +70 °C (-40 – +158 °F), 90% Rh
Protection	Front: IP65 (Gasket integrated) Rear: IP00
Environmental	Pollution degree II, non-condensing

Overvoltage category	II – 230 V supply version – (CE, UL recognized) III – 115 V supply version – (UL recognized)
Resistance to heat and fire	UL94-V0 Temperature for ball pressure test statement According to Annex G (EN 60730-1)
EMC category	Emission: IEC/EN 61000 6-3 Immunity: IEC/EN 61000 6-2
Approvals	UL recognition (US & Canada) (UL 60730-1) CQC CE (LVD & EMC Directive) EAC NSF ROHS2.0 HACCP temperature monitoring in compliance with EN13485 Class I, when u sed with AKS 12 sensor

Parameter List

Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5
Configuration	cFg								
Main switch (-1=Service 0 =OFF, 1=ON,)	r12	-1	1	1	1	1	1	1	1
Predefined applications	o612	AP0	AP5	AP0	AP1	AP2	AP3	AP4	AP5
Cooling/Heating (rE=Cooling, Ht= Heating)	o072	rE	Ht	rE	rE1	rE1	rE1	Ht1	rE
Sensor type selection (n5= NTC 5K, n10=NTC10K, ptc =PTC, pt1=PT1000)	o062	n5	ptc	n10	n10	n10	n10	n10	n10
Reference	**r–**								
Setpoint (unit: °C)	r00	-100	200	2	8	4	4	50	2
Differential (unit: K)	r01	0.1	20	2	2	2	2	2	2
Maximum set point limitation (unit: °C)	r02	-100	200	50	20	6	6	70	50
Minimum set point limitation (unit: °C)	r03	-100	200	-35	4	2	2	30	-35
Display offset (unit: K)	r04	-10	10	0	0	0	0	0	0
Display Unit (°C/ °F)	r05	-C	-F	-C	-C	-C	-C	-C	-C
Calibration of Sair (unit: K)	r09	-20	20	0	0	0	0	0	–
Main switch (-1=Service, 0 =OFF, 1=ON,)	r12	-1	1	1	1	1	1	1	1
Night Set back (unit: K)	r13	-50	50	0	0	0	0	0	0
Reference displacement offset temperature (unit: °C)	r40	-50	20	0	0	0	0	0	–
Pull down duration (unit: min)	r96	0	960	0	–	0	0	–	–
Pull down limit temperature (unit: °C)	r97	-100	200	0	–	0	0	–	–
Alarm	**A–**								
Delay for temp alarm during normal conditions (unit: min)	A03	0	240	30	45	45	45	10	30
Delay for temp alarm during pull- down/start up/ defrost (unit: min)	A12	0	240	60	60	90	90	NA	60

1) This option is a default setting in the controller and cannot be changed.
2) This parameter can only be set when regulation is stopped, i.e. “r12” is set to 0.

Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5
High temp. alarm limit (unit: °C)	A13	-100	200	8	16	10	10	80	8
Low temp. alarm limit (unit: °C)	A14	-100	200	-30	0	0	0	10	-30
DI1 delay (Time delay for s elected DI1 function) (unit: min)	A27	0	240	30	30	30	30	30	30
Condenser High alarm limit (unit: °C)	A37	0	200	80	80	80	80	–	–
Condenser High block limit (unit: °C)	A54	0	200	85	85	85	85	–	–
Voltage protection enable	A72	no	YES	no	no	no	no	no	no
Minimum cut-in voltage (uni t: V)	A73	0	270	0	0	0	0	0	0
Minimum cut-out voltage (u nit: V)	A74	0	270	0	0	0	0	0	0
Maximum voltage (unit: V)	A75	0	270	270	270	270	270	270	270
Defrost	**d–**								
Defrost Method (no=no defr ost, nAt=Natural)	d01	no	nAt	nAt	no	nAt	nAt	no	no
Defrost stop temperature (u nit: °C)	d02	0.0	50.0	6.0	–	–	8.0	–	6.0
Defrost Interval (unit: hour)	d03	0	240	8.0	–	6.0	6.0	–	8.0
Max defrost Time (unit: min)	d04	0	480	30	–	45	60	–	30
Defrost delay at power up (or DI signal) (unit: min)	d05	0	240	0	–	0	0	–	–
Drip delay (unit: min)	d06	0	60	0	–	0	0	–	–
Defrost stop sensor non=N one (Time), Air = Sair temp. Sensor	d10	non	Air	non	–	non1	Air1	–	non

1) This option is a default setting in the controller and cannot be changed.

Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5

Accumulated Compressor r untime to start defrost (0=O FF) (unit: hour)	d18	0	96	0	–	0	0	–	–
Defrost delay after pull dow n cycle (unit: min)	d30	0	960	0	–	0	0	–	–
Compressor	**c–**								
Compressor minimum ON ti me (unit: min)	C01	0	30	0.0	0.0	0.0	0.0	0.0	0.0
Compressor minimum OFF time (unit: min)	C02	0	30	2.0	2.0	2.0	2.0	2.0	2.0
Compressor OFF delay at o pen door (unit: sec)	C04	0	900	900.0	900.0	900.0	900.0	900.0	60.0
Zero crossing selection (YE S / no)	C70	no	YES	YES	YES	YES	YES	YES	YES1
Others	**o–**								
Delay of outputs at startup (unit: sec)	o01	0	600	10	10	10	10	10	101
DI1 configuration	o02	oFF	Sc	oFF	oFF	oFF	oFF	oFF	oFF
Serial address (unit: No)	o03	0	247	0	0	0	0	0	–
Password (unit: No)	o05	0	999	0	0	0	0	0	0
Sensor type selection (n5= NTC 5K, n10=NTC10K, ptc =PTC, pt1=PT1000)	o062	n5	ptc	n10	n10	n10	n10	n10	n10
Cooling/Heating (rE=Coolin g, Ht= Heating)	o072	rE	Ht	rE	rE1	rE1	rE1	Ht1	rE
Display Resolution	o15	0.1	1.0	0.1	0.1	0.1	0.1	0.1	0.11
Predefined applications	o612	AP0	AP5	AP0	AP1	AP2	AP3	AP4	AP5
Save settings as factory WARNING: The earlier fact ory settings are overwritten	o67	no	YES	no	no	no	no	no	–

Display during defrost Air=actual air temperature, FrE=freezed temperature, -d-=”-d-” is displayed	o91	-d-	Air	-d-	–	-d-	-d-	–	-d-1

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Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5
Polarity	P-								
DI1 input polarity (nc / no) no = normally open, nc = normally closed	P73	no	nc	no	no	no	no	no	no
Key board lock (no / yes)(0=no, 1=yes)	P76	no	YES	no	no	no	no	no	–

Note: DI1 configuration list as follows –
nC= Not configured; Sdc = Status display output, doo = Door alarm with resumption,
doA = Door alarm without resumption, SCH = Main switch, nig = Day/ Night mode,
rFd = Reference displasement, EAL = External alarm, dEF = Defrost, Pud = Pull down;
Sc = Condensor Sensor

Code	Alarms	Description
E29	Sair sensor error	Air temperature sensor error
E27	Def sensor error	S5 Evaporator sensor is defect or electrical connection is lost
E30	Sc sensor error	Sc Condenser sensor is defect or electrical connection is lost
A01	High temp alarm	Air temperature in cabinet is too high
A02	Low temp alarm	Air temperature in cabinet is too low
A99	High Volt alarm	Supply voltage is too high (compressor protection)
AA1	Low Volt alarm	Supply voltage is too low (compressor protection)
A61	Condenser alarm	Condenser temp. too high – check air flow
A80	Cond. block alarm	Condenser temp. too high – manual reset of alarm required1)
A04	Door alarm	Door has been open for too long
A15	DI Alarm	External alarm from DI input
A45	Standby Alarm	Control has been stopped by “r12 Main switch”

1) The condenser block alarm can be reset by setting r12 Main switch OFF and ON again or by powering down the controller.

Safety Standards

Check if the supply voltage is correct before connecting the instrument.
Do not expose to water or moisture: Use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent the formation of condensation.

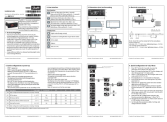
Disposal of the Product

The appliance (or the product) must be disposed in accordance with the local waste disposal legislation.

EU design registration

002566703-0001

Documents / Resources

	Danfoss ERC 211 Electronic Refrigeration Control [pdf] Installation Guide ERC 211 Electronic Refrigeration Control, ERC 211, Electronic Refrigeration Control, Refrigeration Control, Control

References

- User Manual