

Danfoss ERC 213 Electronic Refrigeration Control Installation Guide

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Danfoss ERC 213 Electronic Refrigeration Control



Product Information

Specifications

• Model: ERC 213

• Type: Electronic refrigeration control

• **Relays**: 3

• Designed for: Commercial refrigeration applications

User Interface

The ERC 213 features a user-friendly interface with key functions that include scrolling, main switch ON/OFF, factory reset, defrost control, back function, pull-down start/stop, set point change, and menu access.

Display Icons

- Night mode (Energy saving)
- · Fan running
- Compressor running (Flashes in pull-down mode)
- · Active alarm
- Defrost

Dimensions and Mounting

• **Dimensions**: 83mm x 61.2mm x 66mm

. Mounting: Rear mounting with lock clips

• Electrical connections: Refer to the electrical connections diagram for details on wiring.

Product Usage Instructions

Installation

1. Mount the ERC 213 using the provided drilling template and secure it with clips.

- 2. Ensure correct electrical connections based on the provided diagram.
- 3. Connect power connectors according to the specified phase requirements.

Initial Configuration

Upon power up, perform quick configuration within 30 seconds by following the specified steps.

Usage

- 1. To scroll up or down, perform short presses of less than 1 second.
- 2. To turn the main switch ON/OFF, press and hold for approximately 3 seconds.
- 3. To access the factory reset function, press and hold at power up.

The ERC 213 is a smart multipurpose refrigeration controller with temperature and defrost management, available with 3 relays. The controller has been designed to fulfill today's requirements of commercial refrigeration applications

Technical Highlights

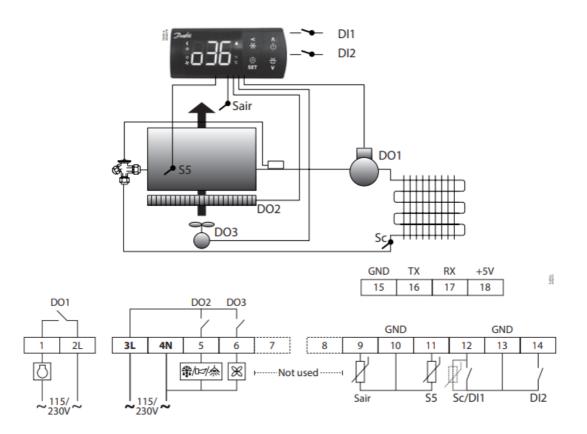
- Ease of use: Four buttons, easy menu structure, and preinstalled application solutions ensure superior usability
- Simple installation: High performance 16 A relay enables direct connection of heavy loads, such as 2 hp compressors, without use of intermediate relays. A wide range of compatible types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

User Interface

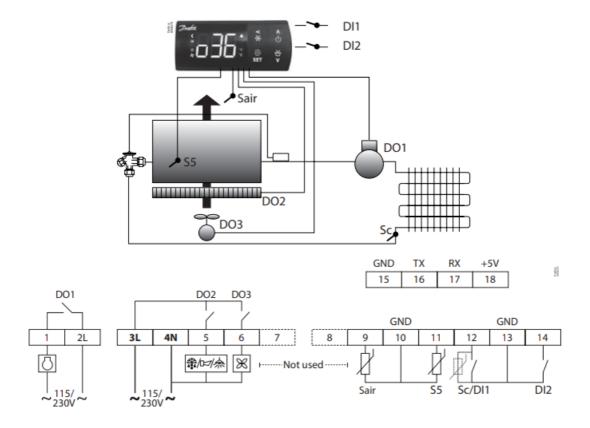
Key F	unction
^ U	Scroll up: Short press (less than 1 second). Main switch ON/OFF: Press and hold (~ 3 seconds). Factory reset: Press and hold at Power up.
\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Scroll down: Short press (less than 1 sec.) Defrost Start/Stop: Press and hold (~3 secs.)
< *	Back function: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

Displ	ay Icons
	Night mode (Energy saving)
4	Fan running
**	Compressor running (Flashes in pull-down mode)
4	Active alarm
***	Defrost
$[^{\circ}C]$	Unit (°C or °F)

Dimensions (mm) and mounting



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

- 1. STEP 1: power on
- 2. **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.
- 3. **STEP 3:** select pre-installed application o61 The display automatically shows the application selection parameter "o61"

APP	Description	Temp. range	Defrost end	DO1	DO2	DO3	Al1	AI2	DI1 ¹⁾	DI2 ¹⁾				
AP0	Fully Configurable Standard Application (Coo	Fully Configurable Standard Application (Cooling / Heating)												
AP1	MT, Natural defrost, Alarm, Fan	2 – 6 °C	By time	\bigcirc		\aleph	Sair	NC	DI1/Sc	DI2				
AP2	MT, Electrical defrost, Fan	0 – 4 °C	By time		3	\aleph	Sair	NC	DI1/Sc	DI2				
AP3	LT, Electrical defrost, Fan	-24 – -18 °C	By time		***	\aleph	Sair	NC	DI1/Sc	DI2				
AP4	MT, Electrical defrost, Fan	0 – 4 °C	By temp (S5)	\bigcirc	***	\aleph	Sair	S5	DI1/Sc	DI2				
AP5	LT, Electrical defrost, Fan	-26 – -20 °C	By temp (S5)	\bigcirc	***	\aleph	Sair	S5	DI1/Sc	DI2				
AP6	Fully configurable simplified application (Cooling / Heating)													
AP7	Heating Thermostat	30 – 70 °C	NA			\times	Sair	NC	DI1	DI2				

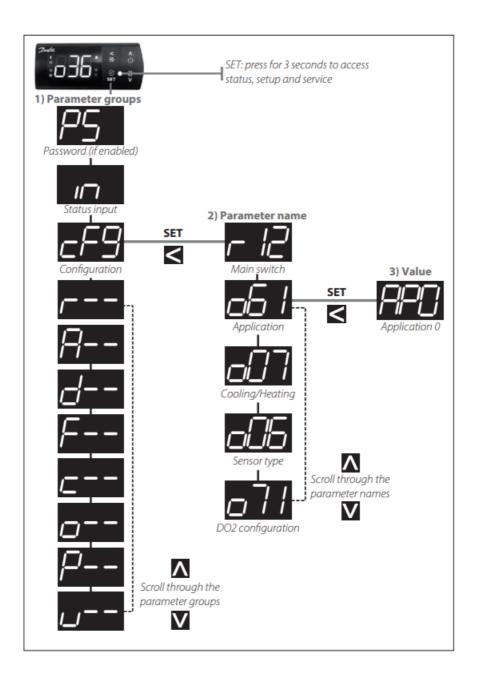
The digital inputs DI1 and DI2 can be configured for multiple functions (refer to Parameters "o02" and "o37").

NC = Not configured

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 AP7, and thus select the simplified list of parameters, by pressing the UP key (circular list).

- 4. **STEP 4:** select sensor type "o06 The display automatically shows the 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.
- 5. STEP 5: configure DO2 output "o71"

The display automatically shows the "o71" parameter to configure the "DO2" output. Select the required configuration (DEF or Lig or ALA) as per the application and press SET to confirm. The display returns to normal display mode and the control is started.



Quick Configuration via "cFg" Menu

1. Press the "SET" button for 3 seconds to access the parameter menu (display will show "cFg").

- 2. Enter the "CFg" menu by pressing the "SET" button (display 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 the back button (<) to come back to the 'CFg" menu.
- 5. Press the DOWN button to scroll through the "cFg" menu parameter list.
- 6. Open the "061 application mode" and select the needed application mode (Press SET).
- 7. Open the "007 Cooling/Heating" and select the needed function and press"SET" (applicable only for APO and AP5).
- 8. Open the "006 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 "071 DO2 configuration" and select the function associated to DO2 output and press "SET".
- 10. Open the "002 DI1 Configuration" and select the function associated to digital input 1 (Press "SET").
- 11. Open the "037 DI2 Configuration" and select the function associated to digital input 2 (Press "SET").
- 12. Navigate back to parameter "r12 Main switch" and set it in "ON" position to start control.
- 13. 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 commer cial 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 e nergy <15 W
	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)
Allowed sensors types	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
	Measuring range:
	-40 - 105 °C (-40 - 221 °F)
Accuracy	Controller accuracy:
	±1 K below -35 °C, ±0.5 K between -35 – 25 °C
	±1 K above 25 °C
Type of action	1B (relay)
	DO1 – Relay 1:
	16 A, 16 (16) A, EN 60730
	10 FLA/60 LRA at 230 V, UL60730
Output	16 FLA/72 LRA at 115 V, UL60730
	DO2 – Relay 2:
	8 A, 2 FLA/12 LRA, UL60730
	8 A, 2 (2 A), EN60730

Features	Description
	DO3 – Relay 3:
	3 A, 2 FLA / 12 LRA, UL60730-1
	3 A, 2 (2 A), EN60730-1
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)
	UL94-V0
Resistance to heat and re	Temperature for ball pressure test statement According to Annex G (EN 60730-1)
	Emission: IEC/EN 61000 6-3
EMC category	Immunity: IEC/EN 61000 6-2
	UL recognition (US & Canada) (UL 60730-1) CQC
	CE (LVD & EMC Directive) EAC
Approvals	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	AP6	AP7
Con guration	cFg										
Main switch (-1= Service 0=OFF, 1 =ON,)	r12	-1	1	1	1	1	1	1	1	1	1
Pride ned applications	o61 ²	AP0	AP7	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Cooling/Heating (r E=Cooling, Ht= H eating)	o07 ²	rE	Ht	rE	rE ¹	rE	Ht ¹				

Sensor type (n5= NTC 5K, n10=NT C10K, ptc=PTC, p t1=PT1000)	o06 ²	n5	ptc	n10	n10	n10	n10	n10	n10	n10	n10
DO2 con g (dEF= Defrost; ALA=alar m; Lig=Light)	o71 ²	dEF	Lig	dEF	ALA ¹	dEF	ALA				
Reference	r										
Setpoint (unit: °C)	r00	-100	200	2	4	2	-20	2	-24	2	50
Dierential (unit: K)	r01	0.1	20	2	2	2	2	2	2	2	4
Maximum set poin t limitation (unit: ° C)	r02	-100	200	50	6	4	-18	4	-20	50	70
Minimum set point limitation (unit: °C)	r03	-100	200	-35	2	0	-24	0	-26	-35	30
Display o set (unit: K)	r04	-10	10	0	0	0	0	0	0	0	0
Display Unit (°C/° F)	r05	-C	-F	-C	-C	-C	-C	-C	-C	-C	-C
Calibration of Sair (unit: K)	r09	-20	20	0	0	0	0	0	0	0	0
Main switch (-1= Service 0=OFF, 1 =ON,)	r12	-1	1	1	1	1	1	1	1	1	1
Night Set back (un it: K)	r13	-50	50	0	0	0	0	0	0	0	0
Reference displac ement o set temperature (unit: °C)	r40	-50	20	0	0	0	0	0	0	_	0
Pull down duration (unit: min	r96	0	960	0	0	0	0	0	0	_	_
Pull down limit te mperature (unit: ° C)	r97	-100	200	0	0	0	0	0	0	_	_

- 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	Мах	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Alarm	A			1			1		1		1
Delay for temp ala rm during normal conditions (unit: m in)	A03	0	240	30	45	30	30	30	30	30	10
Delay for temp ala rm during pull-dow n/startup/defrost (unit: min)	A12	0	240	60	90	60	60	60	60	60	_
High temp. alarm I imit (unit: °C)	A13	-100	200	8	10	8	-15	8	-15	8	80
Low temp. alarm li mit (unit: °C)	A14	-100	200	-30	0	-2	-30	-2	-30	-30	20
DI1 delay (Time d elay for selected D I1 function) (unit: min)	A27	0	240	30	30	30	30	30	30	30	30
DI2 delay (Time d elay for selected D I2 function) (unit: min)	A28	0	240	30	30	30	30	30	30	30	30
Condenser High al arm limit (unit: °C)	A37	0	200	80	80	80	80	80	80	_	_
Condenser High bl ock limit (unit: °C)	A54	0	200	85	85	85	85	85	85	_	_
Voltage protection enable	A72	no	YES	no							
Minimum cut-in vo Itage (unit: V)	A73	0	270	0	0	0	0	0	0	0	0
Minimum cut-out v oltage (unit: V)	A74	0	270	0	0	0	0	0	0	0	0
Maximum voltage (unit: V)	A75	0	270	270	270	270	270	270	270	270	270
Defrost	d										
Defrost Method (n o=None, nAt=Natu ral, EL = Electric; gAS=Hot gas)	d01	no	gAS	EL	nAt	EL	EL	EL	EL	EL	_
Defrost stop temp erature (unit: °C)	d02	0	50	6	_	_	_	6	6	6	-

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

Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Defrost Interval (u nit: hour)	d03	0	240	8	6	8	12	8	12	8	-
Max defrost Time (unit: min)	d04	0	480	30	45	15	15	30	30	30	_
Defrost delay at p ower up (unit: min)	d05	0	240	0	0	0	0	0	0	NA	_
Drip delay (unit: m in)	d06	0	60	0	0	0	0	0	0	21	_
Fan delay after de frosting (unit: min)	d07	0	60	0	0	0	0	0	0	51	_
Fan start temperat ure after defrostin g (unit: °C)	d08	-50	50	-5	50 ¹	50 ¹	50 ¹	-5	-5	_	_
Fan during defrost ing	d09	OFF	on	on	on	OFF	OFF	OFF	OFF	OFF	_
Defrost stop sens or non=None (Tim e), Air = Sair temp . sensor, dEF= S5 Defrost sensor	d10	non	dEF	non	non ¹	non ¹	non ¹	dEF ¹	dEF ¹	non	_
Accumulated Compressor runti me to start defrost (0=OFF) (unit: hour)	d18	0	96	0	0	0	0	0	0	_	_
Defrost on deman d (20=OFF) (unit: K)	d19	0	20	20	20 ¹	20 ¹	20 ¹	20	20	_	_
Defrost delay after pull-down cycle (u nit: min)	d30	0	960	0	0	0	0	0	0	_	_
Fan control	F		I	I	I	I	I	I	I	I	
Fan at compressor cutout (FAo=Fan a lways ON; FFC=F an follow compres sor; FPL= Fan Pul sating)	F01	Fao	FPL	FAo	FAo	FAo	FAo	FAo	FAo	FAo	FAo
Fan stop evap. Te mperature (unit: ° C)	F04	-50	50	50	_	_	_	50	50	50	_
Fan ON Cycle (uni t: min)	F07	0	180	2	2	2	2	2	2	21	2

Fan OFF cycle (un it: min)	180	2	2	2	2	2	2	21	2
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This option is a default setting in the controller and cannot be changed.

Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Compressor	c					1		1		'	1
Compressor / Hea ter minimum ON ti me (unit: min)	C01	0	30	0	0	0	0	0	0	0	0
Compressor /Heat er minimum OFF ti me (unit: min)	C02	0	30	2	2	2	2	2	2	2	2
Compressor OFF delay at open door (unit: sec)	C04	0	900	900	900	900	900	900	900	60 ¹	900
Zero crossing sele ction (YES / no)	C70	no	YES	YES	YES	YES	YES	YES	YES	YES ¹	YES
Others	0										
Delay of outputs a t startup (unit: sec)	o01	0	600	10	10	10	10	10	10	10 ¹	10
DI1 con guration	002	nC	Sc	nC	nC	nC	nC	nC	nC	nC	nC
Serial address (un it: No)	003	0	247	0	0	0	0	0	0	_	0
Password (unit: N o)	o05	0	999	0	0	0	0	0	0	0	0
Sensor type (n5= NTC 5K, n10=NTC10K, ptc =PTC, pt1=PT100 0)	o06 ²	n5	ptc	n10	n10	n10	n10	n10	n10	n10	n10
Cooling/Heating (r E=Cooling, Ht= He ating)	o07 ²	rE	Ht	rE	rE ¹	rE	Ht ¹				
Display Resolution	015	0.1	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1 ¹	0.1
DI2 con guration	o37	nC	Pud	nC	nC	nC	nC	nC	nC	nC	nC
Light Control on= Always on, dAn = Day/Night, doo=Based on do or action	o38	on	doo	on	on	on	on	on	on	on	on
Prede ned applications	o61 ²	AP0	AP7	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Save settings as f actory WARNING: The earlier factory settings are overw ritten	o67	no	YES	no	no	no	no	no	no	_	no

- 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	AP6	AP7
DO2 con g (dEF= Defrost; ALA=alar m; Lig=Light)	o71 ²	dEF	Lig	dEF	ALA ¹	dEF	ALA				
Display during def rost Air=actual air t emperature, FrE=f reezed temperatur e, -d-="-d-" is display ed	o91	Air	-d-	-d-	-d-	-d-	-d-	-d-	-d-	-d- ¹	_

Note: DI1 & DI2 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 displacement, EAL = External alarm, dEF = Defrost,
- Pud = Pull down; Sc = Condensor Sensor
- 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	AP6	AP7
Polarity	P										
DI1 input polarity (nc / no) no = norm ally open, nc = normally clos ed	P73	no	nc	no							
DI2 input polarity (nc / no) no = norm ally open, nc = normally clos ed	P74	no	nc	no							
Invert alarm relay (0= normal, 1= invert relay acti on)	P75	0	1	0	0	0	0	0	0	_	0
Key board lock (n o / yes) (0=no, 1=yes)	P76	no	YES	no	no	no	no	no	no	-	no

Code	Alarms	Description				
E29	Sair sensor error	Air temperature sensor error				
E27	Def sensor error	S5 Evaporator sensor is defective or the 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 ow				
A80	Cond. block alarm	Condenser temp. too high – manual reset of alarm required 1)				
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"				

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

DanfossA/S

- · Climate Solutions
- danfoss.com
- +45 7488 2222

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FAQ

Q: How many relays does the ERC 213 have?

A: The ERC 213 is equipped with 3 relays for versatile control options.

Q: What is the night mode icon for?

A: The night mode icon indicates an energy-saving mode for efficient operation during specific hours.

Documents / Resources



<u>Danfoss ERC 213 Electronic Refrigeration Control</u> [pdf] Installation Guide 080R9313, ERC 213 Electronic Refrigeration Control, ERC 213, Electronic Refrigeration Control, Refrigeration Control, Control

References

• User Manual

Manuals+, Privacy Policy