ERC 213 Digital Controller for Refrigeration Installation Guide

Contents

ERC

ERC 213 Digital Controller for Refrigeration

Specifications

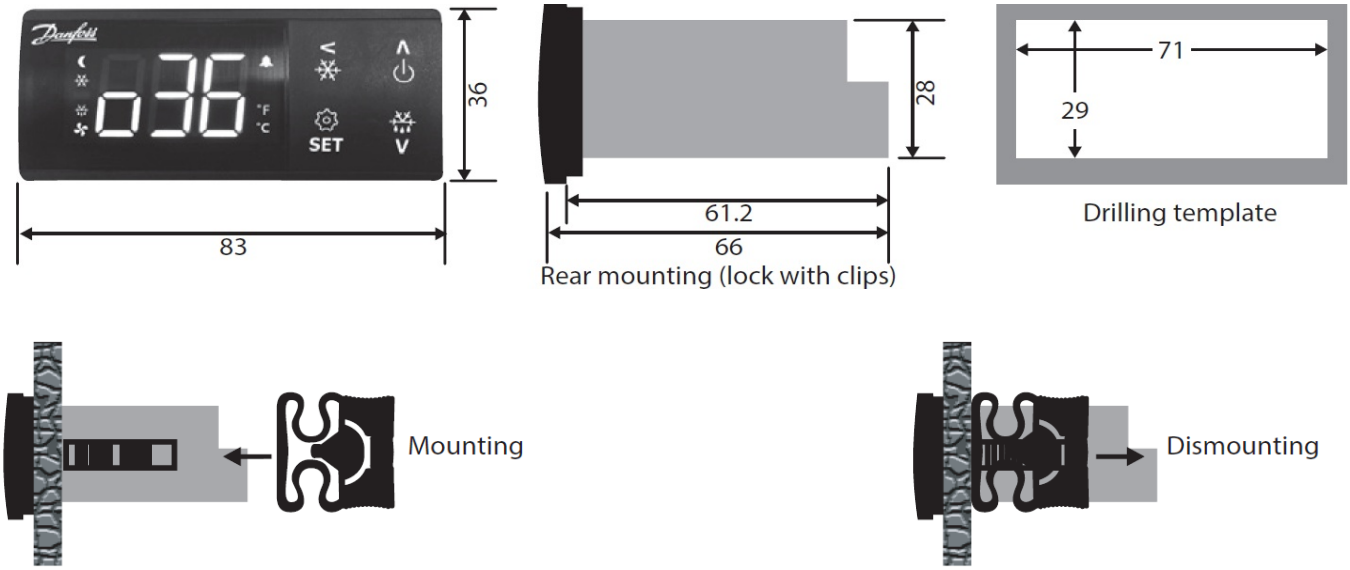
- Model: ERC 213
- Function: Digital controller for refrigeration and defrost with 3 relays
- Dimensions: 61.2mm x 83mm x 66mm
- Mounting: Rear mounting with lock and clips
- Electrical Connections: DI1, DI2, Sair, S5, DO1, DO2, DO3, GND

Product Usage Instructions

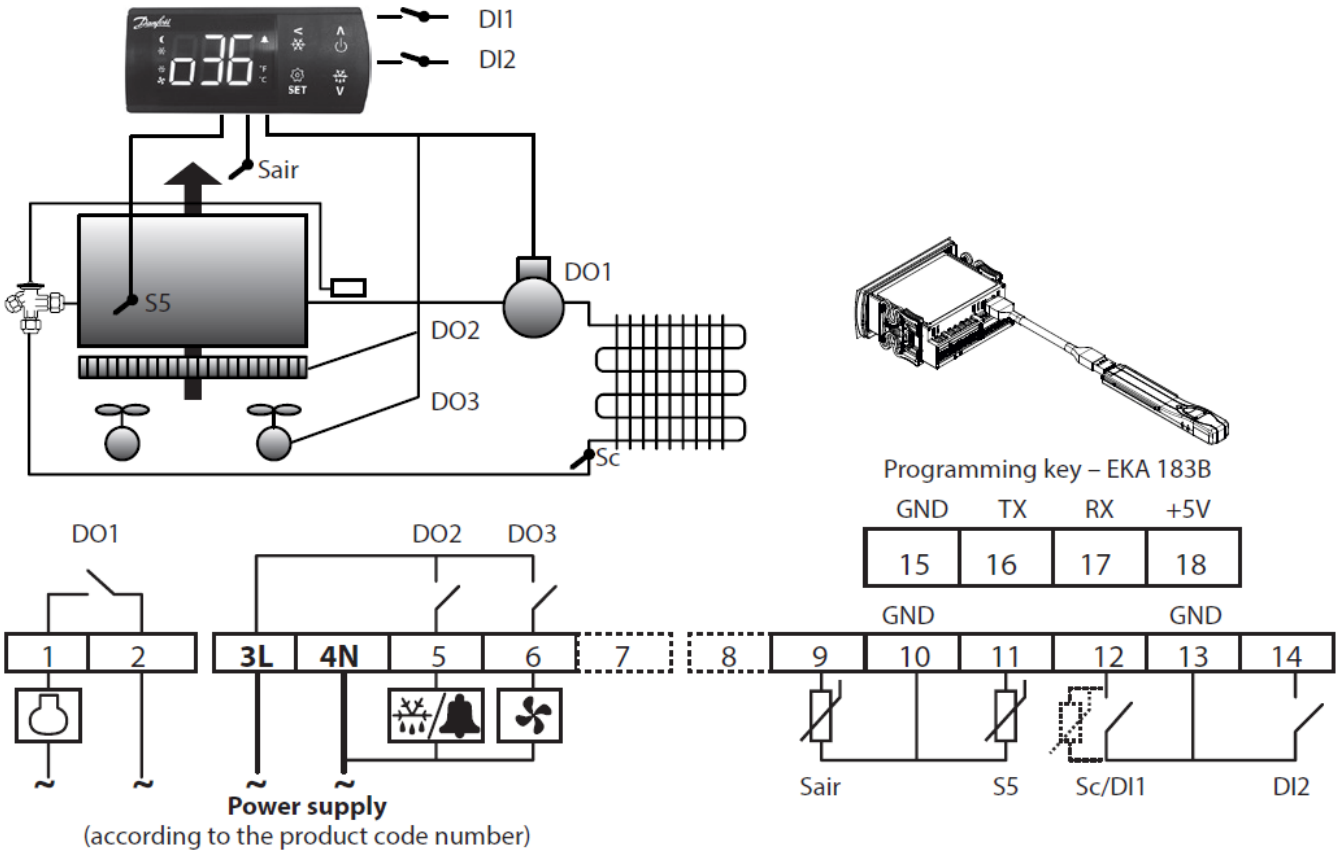
Installation

1. Use the provided drilling template to mark the mounting points.
2. Securely mount the ERC 213 digital controller using the rear mounting system with clips.

Dimensions (mm) and Mounting



Electrical Connections



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

Technical Highlights

- Ease of use: Four buttons, easy menu structure, pre-installed application solutions ensure superior usability.
- Simple installation:

  High Effect 16 A relay enable direct connection of heavy loads without use of intermediate relay: up to 2 hp compressors depending on its power factor and motor efficiency (greater than 0.65 for 230 V and greater than 0.85 for 115 V).

  A wide range of compatible types of sensors and screw connection terminals ensure highly flexible 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 Function	
	Press and hold at power up: FACTORY RESET (“*FAC*” is displayed)
	Press for one second: BACK Press and hold: PULL-DOWN
	Press for one second: TEMPERATURE SETPOINT/OK Press and hold: MENU

	Press for one second: UP Press and hold: ON/OFF
	Press for one second: DOWN Press and hold: DEFROST

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

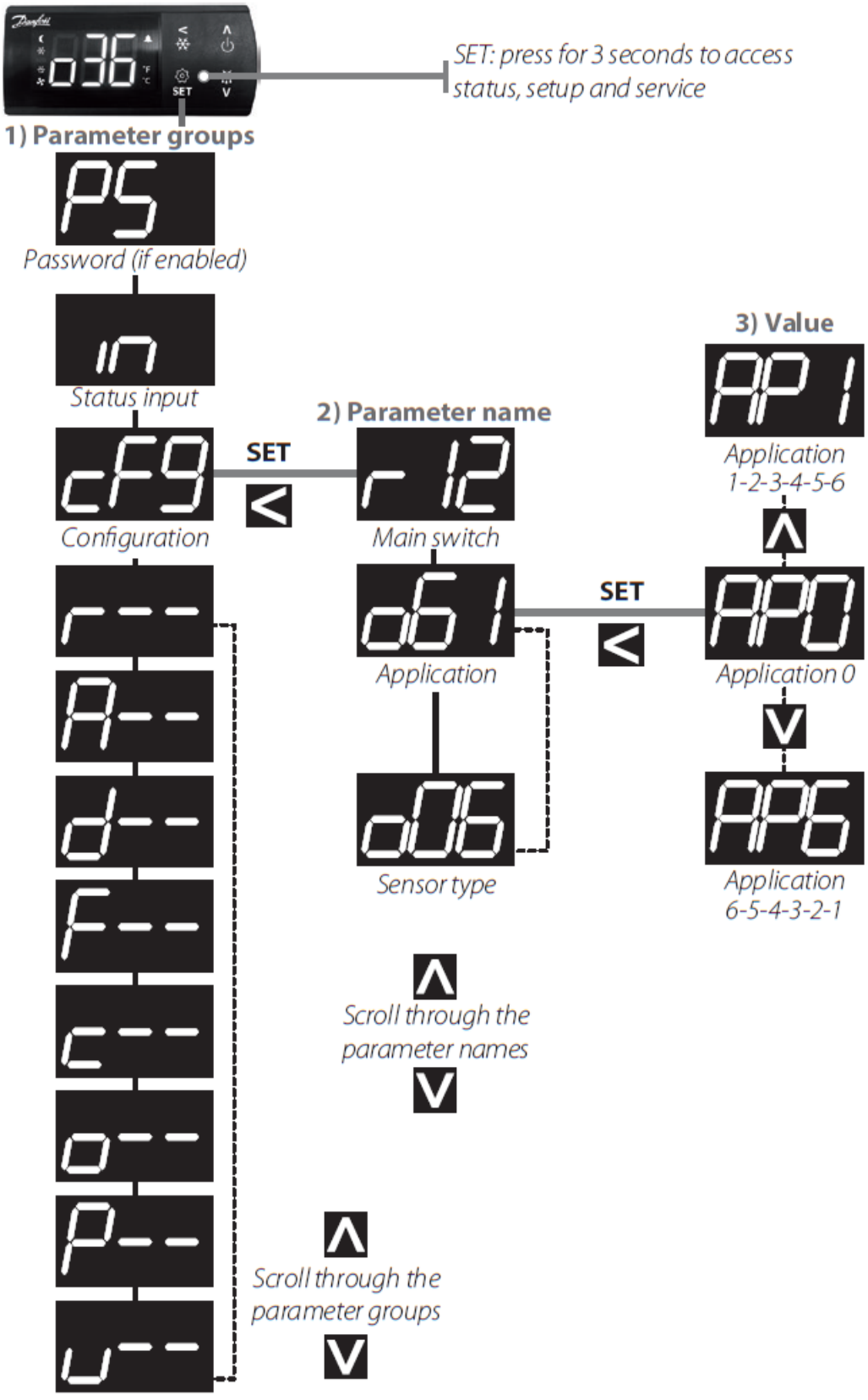
Quick Configuration at Power Up

- 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 AP6, and thus select the simplified list of parameters, by pressing the UP key (circular list).

App	Description
App 0	None (no preset application)
App 1	Medium temperature ventilated refrigeration units (2 – 6 °C), with timed natural defrost
App 2	Medium temperature ventilated refrigeration units (0 – 4 °C), with timed electrical defrost
App 3	Low temperature ventilated refrigeration units (-26 – -20 °C), with timed electrical defrost
App 4	Medium temperature ventilated refrigeration units (0 – 4 °C), with electrical defrost (by temperature)
App 5	Low temperature ventilated refrigeration units (-26 – -20 °C), with electrical defrost (by temperature)
App 6	None (no preset application) with simplified parameter 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.

Menu structure



Quick Configuration via “cFg” Menu

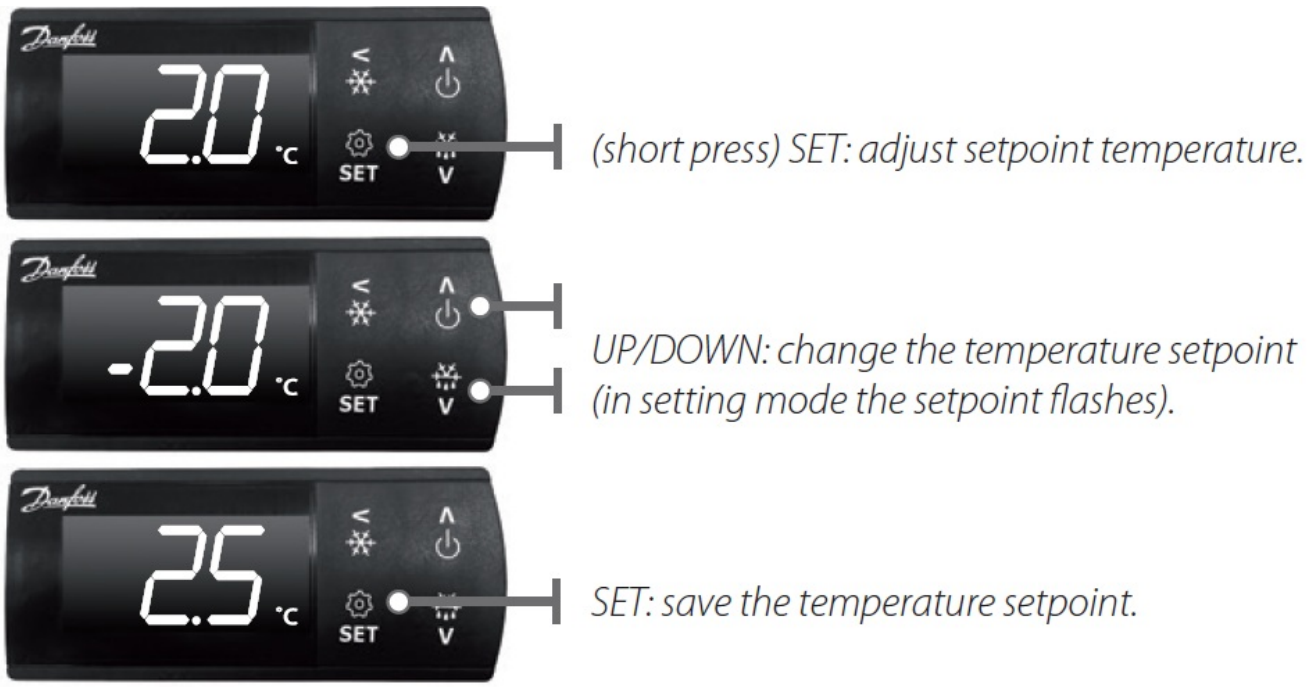
- Press SET for three seconds to access the parameters groups.
- Select “CFg” menu and press SET to enter. The first menu “r12” (main switch) is displayed.
- Switch OFF main switch (r12=0) for changing the pre-installed application.
- Press UP/DOWN to scroll through the parameter list.
- Configure the “o61” parameter to select a pre-installed application
    - Press SET to access the “o61” parameter.

- Press UP/DOWN to select an application (AP0= no application selected).
- Press SET to confirm, “o61” is displayed.

- Continue to set the next parameters (“o06” sensor type) in the “cFg” menu.

Basic operation

Adjust the setpoint temperature



Initiate a manual defrost

Initiate a pull down

PULL DOWN: press for 3 seconds to initiate pull down.

"Pud": is shown for 3 seconds to indicate pull down.
The PULL DOWN icon flashes during pull down.

PULL DOWN: press for 3 seconds to stop pull down.

View an active alarm

Temperature and alarm codes alternate flashes until the alarm resolved. The alarm bell is shown.

Unlock keyboard

- After 5 minutes of no activity, the keypad is locked (if P76=yes).
- When the keypad is locked any button press shows “LoC” in the display.
- Press UP and DOWN buttons simultaneously for 3 seconds to unlock the keyboard. “unl” is displayed for 3 seconds.

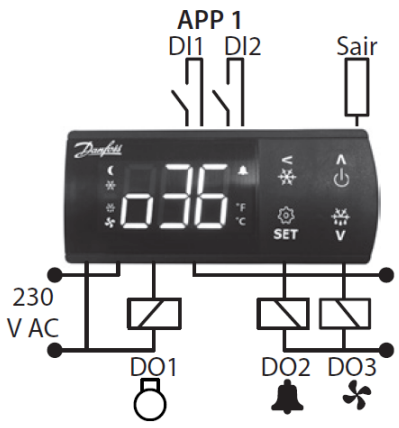
Technical Data

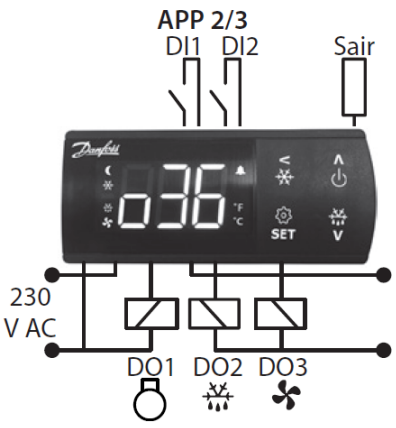
FEATURES	DESCRIPTION
Power supply	115 V AC / 230 V AC 50/60 Hz, galvanic isolated low voltage regulated power supply
Rated power	Less than 0.7 W
Inputs	4 inputs: 2 analogue, 1 analogue/digital and 1 digital
Allowed sensors types	NTC 5000 Ohm at 25 °C, (Beta value=3980 at 25/100 °C - e.g. EKS 211) NTC 10000 Ohm at 25 °C, (Beta value=3435 at 25/85 °C - e.g. EKS 221) PTC 990 Ohm at 25 °C, (e.g. EKS 111) Pt1000, (e.g. 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

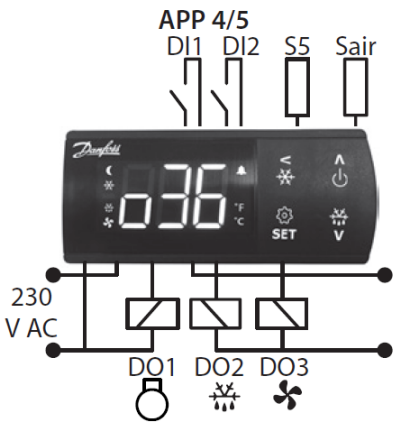
FEATURES	DESCRIPTION
Output	DO1 Compressor relay: 16 A, 16 (16) A, EN 60730 10 FLA / 60 LRA at 230 V, UL60730 16FLA / 72 LRA at 115 V, UL60730
	DO2 Defrost relay: 8 A, 2 FLA / 12 LRA, UL60730 8 A, 2 (2 A), EN60730
	DO3 Fan relay: 3 A, 2 FLA/12 LRA, UL60730 3 A, 2 (2 A), EN60730
Display	LED display, 3 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
Resistance to heat and fire	Category D (UL94-V0)
EMC category	Category I
Approvals	UL recognition (US & Canada) (UL 60730) ENEC (EN 60730) CQC CE (LVD & EMC Directive) EAC (GHOST) NSF ROHS2.0 HACCP temperature monitoring in compliance with EN134785 Class I, when used with AKS 12 sensor

Predefined Application Setup

App	Mode	Description	Temp.	Def. type	Def. end
App 0	Cooling	None (no preset application)			
App 1	Cooling	Medium temperature ventilated refrigeration units with timed natural defrost	(2 – 6 °C)	Natural	Time
App 2	Cooling	Medium temperature ventilated refrigeration units with timed electrical defrost	(0 – 4 °C)	Electrical	Time
App 3	Cooling	Low temperature ventilated refrigeration units with timed electrical defrost	(-26 – -20 °C)	Electrical	Time
App 4	Cooling	Medium temperature ventilated refrigeration units with electrical defrost (by temperature)	(0 – 4 °C)	Electrical	Temperature
App 5	Cooling	Low temperature ventilated refrigeration units with electrical defrost (by temperature)	(-26 – -20 °C)	Electrical	Temperature
App 6	Cooling	None (no preset application) with simplified parameter list			







Parameter List

Parameter Name – ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
Configuration	**cFg**										
Main switch -1=service, 0=OFF, 1=ON	r12	-1	1		1	1	1	1	1	1	1
Predefined applications AP0, AP1, AP2, AP3, AP4, AP5, AP6	o61	AP0	AP6		AP0	AP1	AP2	AP3	AP4	AP5	AP6
Sensor type selection n5= NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000	o06	n5	Pt1		n10	n10	n10	n10	n10	n10	n10
Reference/thermostat	**r–**										
Temperature setpoint	r00	-100.0	200.0	C/F	2.0	4.0	2.0	-24.0	2.0	-24.0	2.0
Differential	r01	0.1	20.0	K	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Min set point limitation	r02	-100.0	200.0	C/F	-35.0	2.0	0.0	-26.0	0.0	-26.0	-35.0
Max set point limitation	r03	-100.0	200.0	C/F	50.0	6.0	4.0	-20.0	4.0	-20.0	50.0
Display offset (correction value in display temperature)	r04	-10.0	10.0	K	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Display Unit (°C/°F)	r05	-C	-F		-C	-C	-C	-C	-C	-C	-C
Calibration of Sair (offset for air temperature calibration)	r09	-20.0	20.0	K	0.0	0.0	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	–
Night set back (offset temperature during night mode)	r13	-50.0	50.0	K	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thermostat reference displacement (offset temperature)	r40	-50.0	50.0	K	0.0	0.0	0.0	0.0	0.0	0.0	–

Pull-down duration	r96	0	960	min	0	0	0	0	0	0	–
Pull-down limit temperatur e	r97	-100. 0	200.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	–
Note: hidden parameters are greyed out											

Parameter Name – ERC 2 13	**Cod e**	**Min**	**Max**	**Unit**	**App. 0 (D ef.)**	**App. 1**	**App. 2**	**App. 3**	**App. 4**	**App. 5**	**App. 6**
Alarm	**A–**										
Delay for temperature alar m during normal conditions	A03	0	240	min	30	45	30	30	30	30	30
Delay for temperature alar m during pull-down/start-u p/defrost	A12	0	240	min	60	90	60	60	60	60	60
High temperature alarm li mit(Cabinet/Room)	A13	-100. 0	200.0	C/F	8.0	10.0	8.0	-15.0	8.0	-15.0	8.0
Low temperature alarm lim it	A14	-100. 0	200.0	C/F	-30.0	0.0	-2.0	-30.0	-2.0	-30.0	-30.0
DI1 delay(time delay for se lected DI1 function)	A27	0	240	min	30	30	30	30	30	30	30
DI2 delay(time delay for se lected DI2 function)	A28	0	240	min	30	30	30	30	30	30	30
Condenser high alarm limit	A37	0	200	C/F	80	80	80	80	80	80	–
Condenser high block limit	A54	0	200	C/F	85	85	85	85	85	85	–
Voltage protection enable	A72	no	yES		no	no	no	no	no	no	no
Minimum cut-in voltage	A73	0	270	V	0	0	0	0	0	0	0
Minimum cut-out voltage	A74	0	270	V	0	0	0	0	0	0	0
Maximum voltage	A75	0	270	V	270	270	270	270	270	270	270

Defrost	**d–**										
Defrost method no=no defr ost, nAt=natural, EL=electrical, gAS=hot gas	d01	no	gAS		EL	nAt	EL	EL	EL	EL	EL
Defrost stop temperature	d02	0.0	50.0	C/F	6.0	–	–	–	6.0	6.0	6.0
Defrost interval	d03	0	240	hours	8	6	8	12	8	12	8
Max defrost time	d04	0	480	min	30	45	15	15	30	30	30
Defrost delay at power up(or DI signal)	d05	0	240.0	min	0	0	0	0	0	0	–
Drip delay	d06	0	60	min	0	0	0	0	0	0	5
Fan delay after defrost	d07	0	60	min	0	0	0	0	0	0	5
Fan start temperature after defrost	d08	-50.0	0.0	C/F	-5.0	–	–	–	-5.0	-5.0	–
Fan during defrost	d09	oFF	on		on	on	on	on	on	on	on
Note: hidden parameters are greyed out											

Parameter Name – ERC 213	**Code**	**Min**	**Max**	**Unit**	**App. 0 (Def.)**	**App. 1**	**App. 2**	**App. 3**	**App. 4**	**App. 5**	**App. 6**
Defrost stop sensor configuration non=time, Air=Sair (air temperature), dEF=S5 (defrost sensor)	d10	non	dEF		non	non	non	non	dEF	dEF	non
Compressor accumulated runtime to start defrost, 0= OFF	d18	0	96	hours	0	0	0	0	0	0	–
Defrost on demand20.0=OFF	d19	0.0	20.0	K	20.0	–	–	–	20.0	20.0	–
Defrost delay after pull-down0=OFF	d30	0	960	min	0	0	0	0	0	0	–
Fan control	**F–**										
Fan at compressor cutout FFc=fan follow compressor, FAo=fan always ON,FPL= fan pulsating	F01	FFc	FPL		FAo	FAo	FAo	FAo	FAo	FAo	FAo
Fan stop evaporator temperature50.0=OFF	F04	-50.0	50.0	C/F	50.0	–	–	–	50.0	50.0	–
Fan ON cycle	F07	0	15	min	2	2	2	2	2	2	2
Fan OFF cycle	F08	0	15.0	min	2	2	2	2	2	2	2
Compressor	**c–**										
Compressor minimum ON time	C01	0	30	min	0	0	0	0	0	0	0
Compressor minimum OFF time	C02	0	30	min	2	2	2	2	2	2	2
Compressor OFF delay at door open	C04	0	15	min	0	0	0	0	0	0	1
Zero crossing selection	C70	no	yES		yES	yES	yES	yES	yES	yES	yES
Note: hidden parameters are greyed out											

Parameter Name – ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
Others	**o–**										
Delay of output sat startup	o01	0	600	min	5	5	5	5	5	5	5
DI1 configuration oFF=not used, 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=condenser sensor	o02	oFF	Sc		oFF	oFF	oFF	oFF	oFF	oFF	oFF
Serial address	o03	0	247		0	0	0	0	0	0	–
Password	o05	no	999		no	no	no	no	no	no	no
Sensor type selection n5= NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000	o06	n5	Pt1		n10	n10	n10	n10	n10	n10	–
Display resolution 0.1=steps of 0.1 °C 0.5=steps of 0.5 °C, 1.0=steps of 1.0 °C	o15	0.1	1.0		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Relay 1 counter(1 count=100 cycles of operation)	o23	0	999		0	0	0	0	0	0	–
Relay 2 counter(1 count=100 cycles of operation)	o24	0	999		0	0	0	0	0	0	–
Relay 3 counter(1 count=100 cycles of operation)	o25	0	999		0	0	0	0	0	0	–
DI2 configuration oFF=not used, 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	o37	oFF	Pud		oFF	oFF	oFF	oFF	oFF	oFF	oFF
Predefined applications	o61	AP0	AP6		AP0	AP1	AP2	AP3	AP4	AP5	–
Note: hidden parameters are greyed out											

Parameter Name – ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6

Save settings as factory WARNING: the earlier factory settings are over written	o67	no	yES		no	no	no	no	no	no	–
DO2 config dEF=defrost, ALA=alarm	o71	dEF	ALA		dEF	ALA	dEF	dEF	dEF	dEF	dEF
Display at defrost Air=actual air temperature, FrE=frezed temperature, -d-=”-d-” is displayed	o91	Air	-d-		-d-	-d-	-d-	-d-	-d-	-d-	-d-
Polarity	**P–**										
DI1 input polarity nc=normally closed, no=normally open	P73	nc	no		no	no	no	no	no	no	no
DI2 input polarity nc=normally closed, no=normally open	P74	nc	no		no	no	no	no	no	no	no
Invert alarm relay0=normal, 1=invert relay action	P75	0	1		0	0	–	–	–	–	–
Keyboard lock enable	P76	no	yES		no	no	no	no	no	no	–
Readouts	**u–**										
Controller StatusS0=cooling ON/Heating ON,S2=wait for compressor ON time to elapse, S3=wait for compressor OFF time to elapse-restart time, S4=drip OFF delay after defrost, S10=cooling stop S11=cooling stopped by thermostat/heating OFF, S14=defrosting state, S15=fan delay state after defrost, S17=door open (DI input), S20=emergency cooling, S25=manual control of outputs, S30=continous cycle/Pull-down,S32=delay of outputs at power up	u00	S0	S32		—						
Air temperature (Sair)	u01	-100.0	200.0	C/F	—						
Read the present regulation reference	u02	-100.0	200.0	C/F	—						
Defrost temperature (S5)	u09	-100.0	200.0	C/F	—	–	–	–			
Note: hidden parameters are greyed out											

Parameter Name – ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
DI1 input	u10	oFF	on		—						
Status of night operation	u13	oFF	on		—						
DI2 input	u37	oFF	on		—						
Condenser temperature (Sc)	U09	-100.0	200.0	C/F	—						
Compressor relay status	u58	oFF	on		—						
Fan relay status	u59	oFF	on		—						
Defrost relay status	u60	oFF	on		—						
Light relay status	u63	oFF	on		—						
Firmware version readout	u80	000	999		—						
Alarm status											
Sair air temperature sensor error	E29										
S5 defrost sensor error	E27										
Sc condenser sensor error	E30										
High temperature alarm	A01										
Low temperature alarm	A02										
High voltage alarm	A99										
Low voltage alarm	AA1										
Condenser alarm	A61										
Door alarm	A04										
Standby alarm	A45										
DI external alarm	A15										
Note: hidden parameters are greyed out											

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 of in accordance with the local waste disposal legislation.

EU Design Registration
002566703-0001
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KoolCode App
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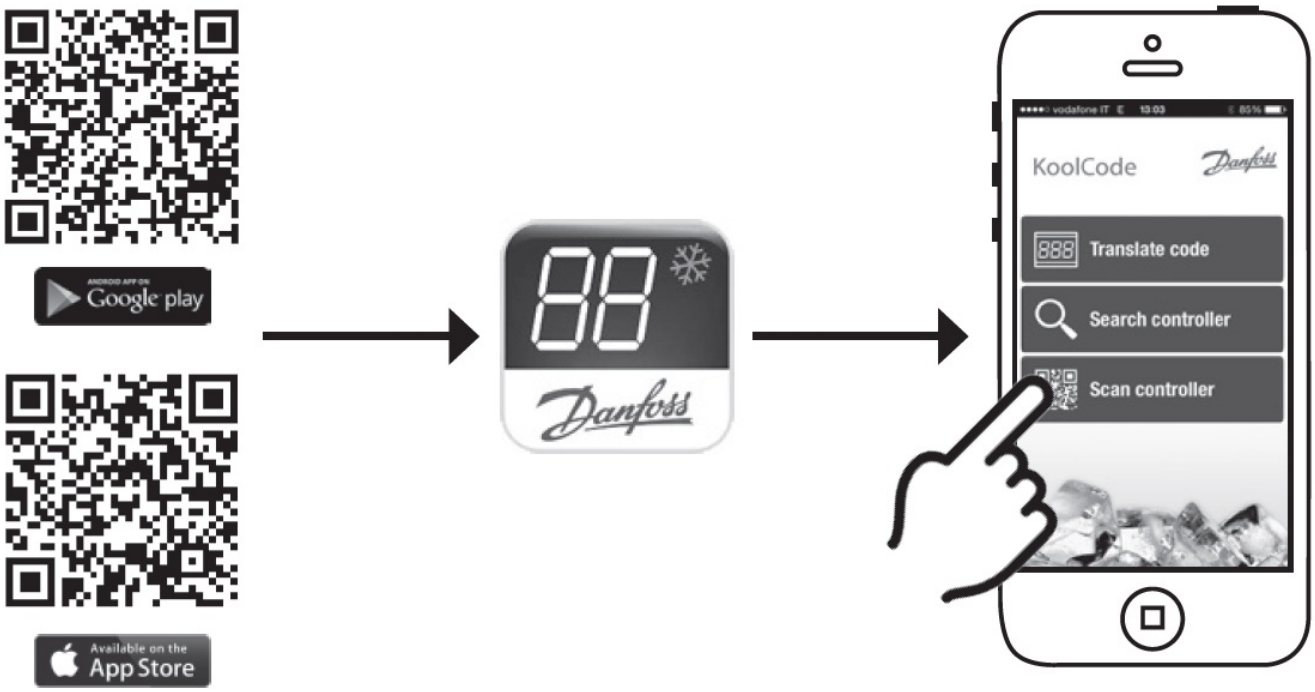

Scan this code to find out more about the ERC 213 parameter

Download ERC 21X series www.danfoss.com/erc

Frequently Asked Questions

- **Q: How do I reset the controller to factory settings?**
  A: Press and hold the specified button during power-up to perform a factory reset. Follow on-screen prompts for confirmation.
- **Q: What should I do if I encounter an active alarm icon on the display?**
  A: Check the user manual for information on troubleshooting alarms. You may need to take specific actions based on the alarm displayed.

Documents / Resources

	**ERC ERC 213 Digital Controller for Refrigeration** [pdf] Installation Guide ERC 213, ERC 213 Digital Controller for Refrigeration, Digital Controller for Refrigeration, Controller for Refrigeration, Refrigeration

References

- **User Manual**