

Installation guide

# ERC 213

## Digital regulator for refrigeration and defrosting, 3 relays.

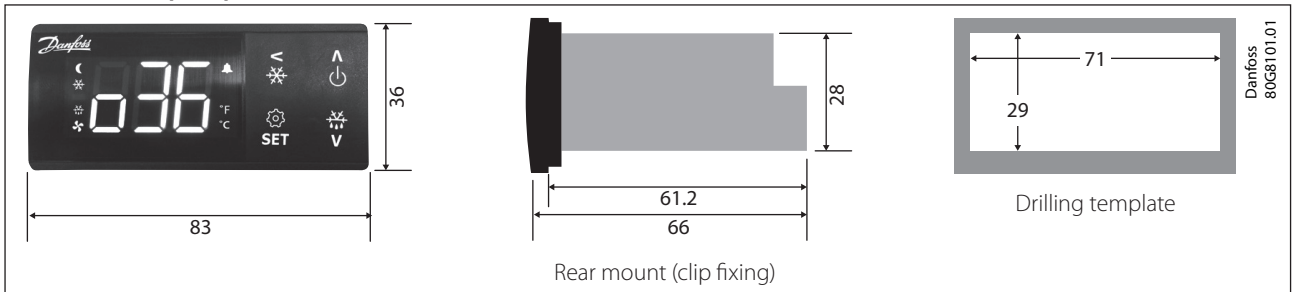
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The **ERC 213** is a smart, multipurpose integrated refrigeration controller with temperature and defrost management, available with 3 relays. This controller is for Operating temperature sensing control, suitable for refrigeration and heating applications. Incorporated control has been designed to fulfil today's requirements for commercial refrigeration applications.

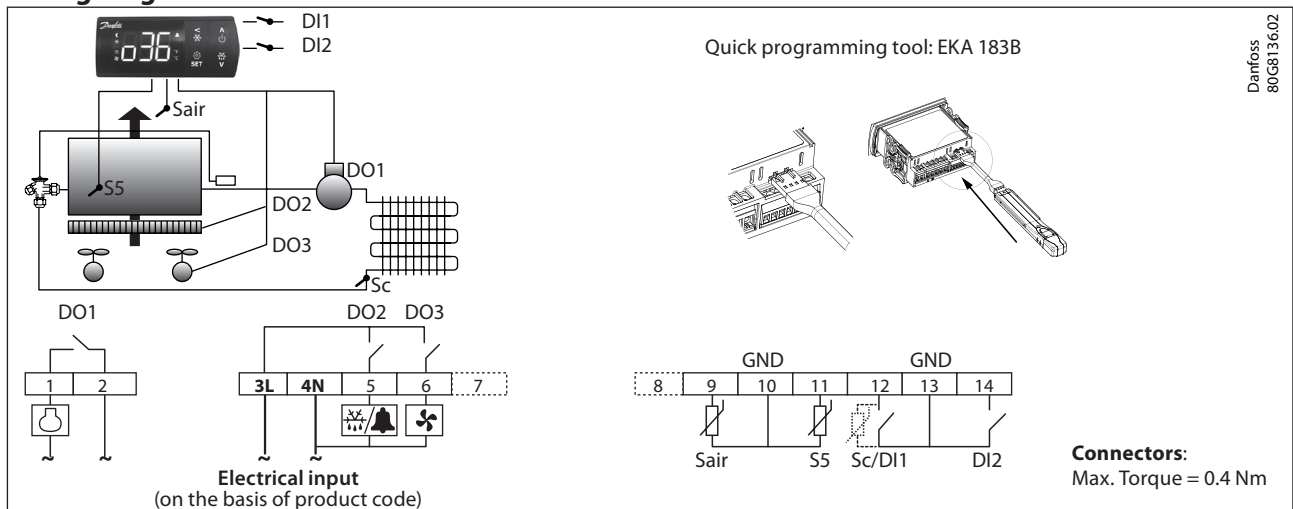
### Dimensions (mm)



### Assembly















### Wiring diagram



## 1 - Technical features

- **Easy to use:** the four buttons, the easy-to-read menu structure and the preinstalled application solutions guarantee optimal usability.
- **Simple installation:** the 16 A relay means heavy loads can be connected directly without having to use an intermediate relay: compressors up to 2 HP on the basis of the power factor and efficiency of the motor (over 0.65 at 230 V and over 0.85 at 115 V). A vast range of compatible sensor types and screw terminals guarantee highly flexible installation.
- **Unit protection:** special software functions, protecting the compressor from voltage fluctuations or high condensation temperature, to guarantee optimal unit performance.
- **Energy efficiency:** defrosting on request, day/night mode and intelligent evaporator fan management guarantee maximum energy efficiency.

## 2 - User interface

Button function			
	Press and hold down on startup RESET FACTORY SETTINGS ("FAC" is displayed)		
	Press for one second: <b>BACK</b> Press and hold down: <b>PULL-DOWN</b>		Press for one second: <b>UP</b> Press and hold down: <b>ON/OFF</b>
	Press for one second: <b>TEMPERATURE SETPOINT/OK</b> Press and hold down: <b>MENU</b>		Press for one second: <b>DOWN</b> Press and hold down: <b>DEFROSTING</b>
Display icons			
	Night mode (energy saving)		Fan on
	Compressor on Blinks in pull-down mode		Alarm activated
	Defrosting		Units (°C or °F)

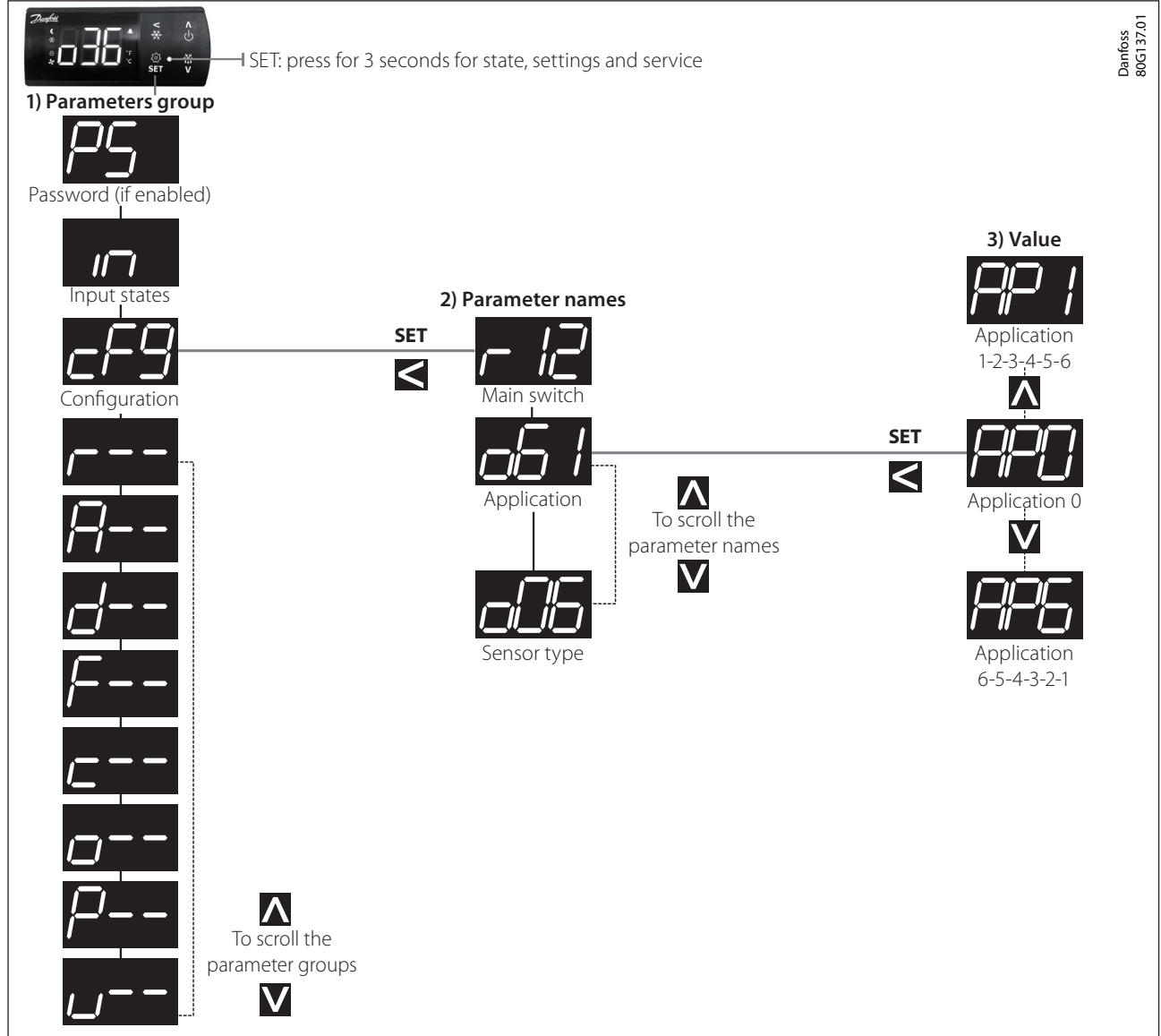
## 3 - Quick-start configuration

- **STEP 1: Startup**
- **STEP 2: Select quick-start configuration menu**  
Within 30 seconds of startup, press "<" BACK for 3 seconds.  
The main switch "r12" is automatically set to OFF.
- **STEP 3: Select the preinstalled application "o01"**  
The display automatically shows the application selection parameter "o01".  
Press SET to select the preinstalled application.  
The display shows the default value (for example "AP0", blinking).  
Select the type of application by pressing UP/DOWN and then SET to confirm.  
The regulator presets the parameter values on the basis of the application selected and hides any irrelevant parameters.  
Tip: you can easily switch from AP0 to AP6 and therefore select the simplified parameters list by pressing the UP button (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 the sensor type "o06"**  
The display automatically shows the sensor selection parameter "o06".  
Press SET to select the type of sensor.  
The display shows the default value (for example "n10", blinking).  
Select the type of sensor by pressing UP/DOWN (n5=NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000) then SET to confirm.  
*NOTE: all the sensors must be the same type.*

#### 4 - Menu structure

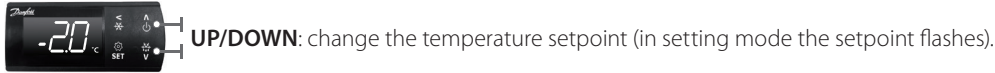


#### 5 - Quick configuration with "cFg" menu

- Press SET for three seconds to open the parameter groups.
- Select the "cFg" menu and press SET to open. The first menu "r12" (main switch) is displayed.
- Set the main switch to OFF (r12=0) to change the preinstalled application.
- Press UP/DOWN to scroll through the parameters list.
- Configure the parameter "o61" to select a preinstalled application:
  - Press SET to open the parameter "o61".
  - Press UP/DOWN to select an application (AP0= no application).
  - Press SET to confirm; "o61" is displayed.
- Continue to set the following parameters (sensor type "o06") in the "cFg" menu.

## 6 - Basic functions

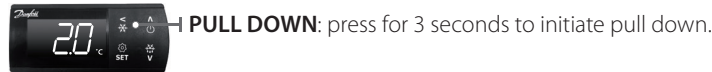
### Adjusting the setpoint temperature



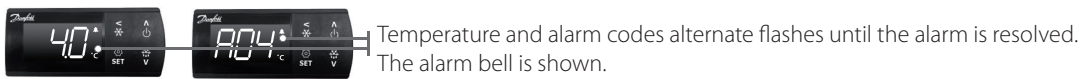
### Initiate a manual defrost



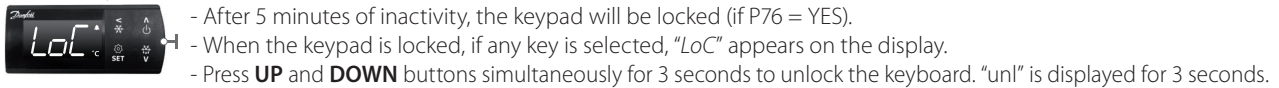
### Initiate a pull down



### View an active alarm



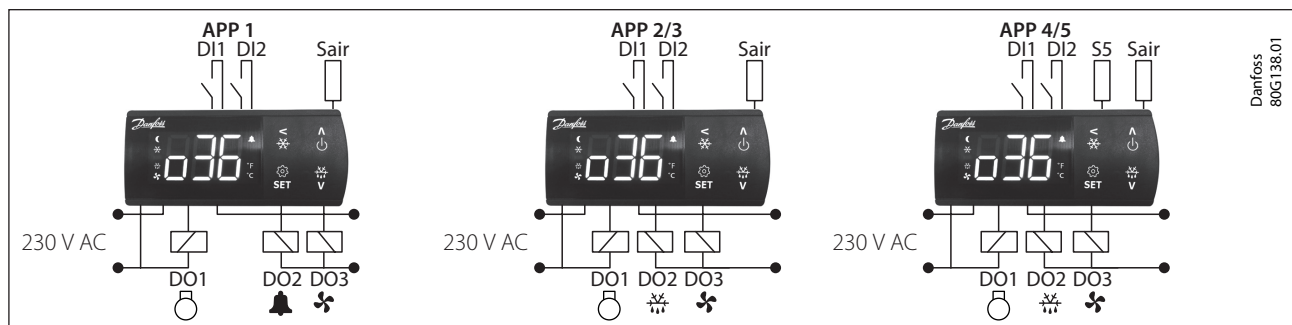
### Unlock keyboard



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## 7 - Default application settings

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			



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## 8 - Technical Data

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	Low voltage, regulated, galvanically isolated, 115 V AC or 230 V AC, 50/60 Hz input
Rated power	Less than 0.7 W
Inputs	Sensor inputs, Digital inputs, Programming key Connected to SELV limited energy <15 W
Types of sensors allowed	NTC 5000 Ohms at 25 °C (beta = 3,980 at 25/100 °C - EKS 211 for example) NTC 10000 Ohms at 25 °C (beta = 3,435 at 25/85 °C - EKS 221 for example) PTC 990 Ohms at 25 °C (EKS 111 for example) Pt1000 (AKS 11, AKS 12, AKS 21 for example)
Sensors in "Kit Solution"	NTC 10000 Ohms at 25 °C, 1.5 m cable
Precision	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	Compressor relay DO1: 16 A, 16 (16) A, EN 60730-1 10 FLA / 60 LRA at 230 V, UL60730-1 16 FLA / 72 LRA at 115 V, UL60730-1  Defrosting relay DO2: 8 A, 2 FLA / 12 LRA, UL60730-1 8 A, 2 (2 A), EN60730-1  Fan relay DO3: 3 A, 2 FLA / 12 LRA, UL60730-1 3 A, 2 (2 A), EN60730-1
Display	LED 3-figure display, decimal point and multifunction 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 (with seal) Rear: IP00
Environmental data	Pollution degree II, condensate free
Overvoltage category	II - 230 V supply version - (ENEC, UL recognized) III - 115 V supply version - (UL recognized)
Heat and fire resistant	Category D (UL94-V0) Temperature for ball pressure test statement "According to Annex G" (EN 60730-1)
EMC category	Category I
Certifications	UL acknowledgement (USA and Canada) (UL 60730-1) ENEC (EN 60730-1) CQC EC (LVD and EMC Directives) EAC (GHOST) NSF ROHS2.0 HACCP temperature monitoring in compliance with EN134785 Class I if used with sensor AKS 12

## 9 - Parameters

Parameter Name - ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
<b>Configuration</b>	<b>cFg</b>										
<b>Main switch</b> <i>-1=service, 0=OFF, 1=ON</i>	r12	-1	1		1	1	1	1	1	1	1
<b>Predefined applications</b> <i>AP0, AP1, AP2, AP3, AP4, AP5, AP6</i>	o61	AP0	AP6		AP0	AP1	AP2	AP3	AP4	AP5	AP6
<b>Sensor type selection</b> <i>n5=NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000</i>	o06	n5	Pt1		n10	n10	n10	n10	n10	n10	n10
<b>Reference / thermostat</b>	<b>r--</b>										
<b>Temperature setpoint</b>	r00	-100.0	200.0	C/F	2.0	4.0	2.0	-24.0	2.0	-24.0	2.0
<b>Differential</b>	r01	0.1	20.0	K	2.0	2.0	2.0	2.0	2.0	2.0	2.0
<b>Min set point limitation</b>	r02	-100.0	200.0	C/F	-35.0	2.0	0.0	-26.0	0.0	-26.0	-35.0
<b>Max set point limitation</b>	r03	-100.0	200.0	C/F	50.0	6.0	4.0	-20.0	4.0	-20.0	50.0
<b>Display offset</b> (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
<b>Display Unit (°C/°F)</b>	r05	-C	-F		-C	-C	-C	-C	-C	-C	-C
<b>Calibration of Sair</b> (offset for air temperature calibration)	r09	-20.0	20.0	K	0.0	0.0	0.0	0.0	0.0	0.0	-
<b>Main switch</b> <i>-1=service, 0=OFF, 1=ON</i>	r12	-1	1		1	1	1	1	1	1	-
<b>Night set back</b> (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
<b>Thermostat reference displacement</b> (offset temperature)	r40	-50.0	50.0	K	0.0	0.0	0.0	0.0	0.0	0.0	-
<b>Pull-down duration</b>	r96	0	960	min	0	0	0	0	0	0	-
<b>Pull-down limit temperature</b>	r97	-100.0	200.0	C/F	0.0	0.0	0.0	0.0	0.0	0.0	-
<b>Alarm</b>	<b>A--</b>										
<b>Delay for temperature alarm</b> during normal conditions	A03	0	240	min	30	45	30	30	30	30	30
<b>Delay for temperature alarm</b> during pull-down / start-up / defrost	A12	0	240	min	60	90	60	60	60	60	60
<b>High temperature alarm limit</b> (Cabinet / Room)	A13	-100.0	200.0	C/F	8.0	10.0	8.0	-15.0	8.0	-15.0	8.0
<b>Low temperature alarm limit</b>	A14	-100.0	200.0	C/F	-30.0	0.0	-2.0	-30.0	-2.0	-30.0	-30.0
<b>DI1 delay</b> (time delay for selected DI1 function)	A27	0	240	min	30	30	30	30	30	30	30
<b>DI2 delay</b> (time delay for selected DI2 function)	A28	0	240	min	30	30	30	30	30	30	30
<b>Condenser high alarm limit</b>	A37	0	200	C/F	80	80	80	80	80	80	-
<b>Condenser high block limit</b>	A54	0	200	C/F	85	85	85	85	85	85	-
<b>Voltage protection enable</b>	A72	no	yES		no	no	no	no	no	no	no
<b>Minimum cut-in voltage</b>	A73	0	270	V	0	0	0	0	0	0	0
<b>Minimum cut-out voltage</b>	A74	0	270	V	0	0	0	0	0	0	0
<b>Maximum voltage</b>	A75	0	270	V	270	270	270	270	270	270	270
<b>Defrost</b>	<b>d--</b>										
<b>Defrost method</b> <i>no=no defrost, nAt=natural, EL=electrical, gAS=hot gas</i>	d01	no	gAS		EL	nAt	EL	EL	EL	EL	EL
<b>Defrost stop temperature</b>	d02	0.0	50.0	C/F	6.0	-	-	-	6.0	6.0	6.0
<b>Defrost interval</b>	d03	0	240	hours	8	6	8	12	8	12	8
<i>N.B.: hidden parameters are greyed out</i>											

Parameter Name - ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
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
Defrost stop sensor configuration <i>non=time, Air=Sair (air temperature), dEF=S5 (defrost sensor)</i>	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 demand 20.0=OFF	d19	0.0	20.0	K	20.0	-	-	-	20.0	20.0	-
Defrost delay after pull-down 0=OFF	d30	0	960	min	0	0	0	0	0	0	-
<b>Fan control</b>	<b>F--</b>										
Fan at compressor cutout <i>FFc=fan follow compressor, FAo=fan always ON, FPL=fan pulsating</i>	F01	FFc	FPL		FAo	FAo	FAo	FAo	FAo	FAo	FAo
Fan stop evaporator temperature 50.0=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
<b>Compressor</b>	<b>c--</b>										
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
<b>Others</b>	<b>o--</b>										
Delay of outputs at startup	o01	0	600	min	5	5	5	5	5	5	5
DI1 configuration <i>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</i>	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 <i>n5=NTC 5 K, n10=NTC 10 K, Ptc=PTC, Pt1=Pt1000</i>	o06	n5	Pt1		n10	n10	n10	n10	n10	n10	-
Display resolution <i>0.1=steps of 0.1 °C, 0.5=steps of 0.5 °C, 1.0=steps of 1.0 °C</i>	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	-
<i>N.B.: hidden parameters are greyed out</i>											

Parameter Name - ERC 213	Code	Min	Max	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
<b>Relay 2 counter</b> (1 count=100 cycles of operation)	o24	0	999		0	0	0	0	0	0	-
<b>Relay 3 counter</b> (1 count=100 cycles of operation)	o25	0	999		0	0	0	0	0	0	-
<b>DI2 configuration</b> <i>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</i>	o37	oFF	Pud		oFF	oFF	oFF	oFF	oFF	oFF	oFF
<b>Predefined applications</b>	o61	AP0	AP6		AP0	AP1	AP2	AP3	AP4	AP5	-
<b>Save settings as factory</b> WARNING: the earlier factory settings are overwritten	o67	no	yES		no	no	no	no	no	no	-
<b>DO2 config</b> <i>dEF=defrost, ALA=alarm</i>	o71	dEF	ALA		dEF	ALA	dEF	dEF	dEF	dEF	dEF
<b>Display at defrost</b> <i>Air=actual air temperature, FrE=freezed temperature, -d="-d-" is displayed</i>	o91	Air	-d-		-d-	-d-	-d-	-d-	-d-	-d-	-d-
<b>Polarity</b>	P--										
<b>DI1 input polarity</b> <i>nc=normally closed, no=normally open</i>	P73	nc	no		no	no	no	no	no	no	no
<b>DI2 input polarity</b> <i>nc=normally closed, no=normally open</i>	P74	nc	no		no	no	no	no	no	no	no
<b>Invert alarm relay</b> <i>0=normal, 1=invert relay action</i>	P75	0	1		0	0	-	-	-	-	-
<b>Keyboard lock enable</b>	P76	no	yES		no	no	no	no	no	no	-

N.B.: 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
<b>Readouts</b>	u--										
<b>Controller Status</b> S0=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		--						
<b>Air temperature (Sair)</b>	u01	-100.0	200.0	C/F	---						
<b>Read the present regulation reference</b>	u02	-100.0	200.0	C/F	---						
<b>Defrost temperature (S5)</b>	u09	-100.0	200.0	C/F	---	-	-	-			
<b>DI1 input</b>	u10	oFF	on		---						
<b>Status of night operation</b>	u13	oFF	on		---						
<b>DI2 input</b>	u37	oFF	on		---						
<b>Condenser temperature (Sc)</b>	U09	-100.0	200.0	C/F	---						
<b>Compressor relay status</b>	u58	oFF	on		---						
<b>Fan relay status</b>	u59	oFF	on		---						
<b>Defrost relay status</b>	u60	oFF	on		---						
<b>Light relay status</b>	u63	oFF	on		---						
<b>Firmware version readout</b>	u80	000	999		---						
<b>Alarm status</b>											
<b>Sair air temperature sensor error</b>	E29										
<b>S5 defrost sensor error</b>	E27										
<b>Sc condenser sensor error</b>	E30										
<b>High temperature alarm</b>	A01										
<b>Low temperature alarm</b>	A02										
<b>High voltage alarm</b>	A99										
<b>Low voltage alarm</b>	AA1										
<b>Condenser alarm</b>	A61										
<b>Door alarm</b>	A04										
<b>Standby alarm</b>	A45										
<b>DI external alarm</b>	A15										

*N.B.: hidden parameters are greyed out*

**Safety standards**

Check the input voltage is correct before connecting the instrument.  
Do not expose to water or damp: only use the regulator within the design operating limits, avoiding sudden temperature changes with high atmospheric humidity to prevent condensate forming.

**Product disposal**

The device (or product) must be disposed of in compliance with local waste disposal legislation.

**EU design registration**

002566703-0001

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