ENGINEERING
TOMORROW

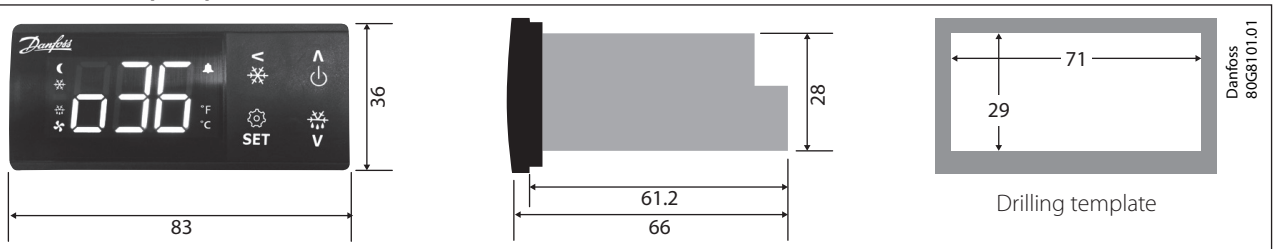
Installation guide

ERC 214
Digital regulator for refrigeration and defrosting, 4 relays.

520H11068

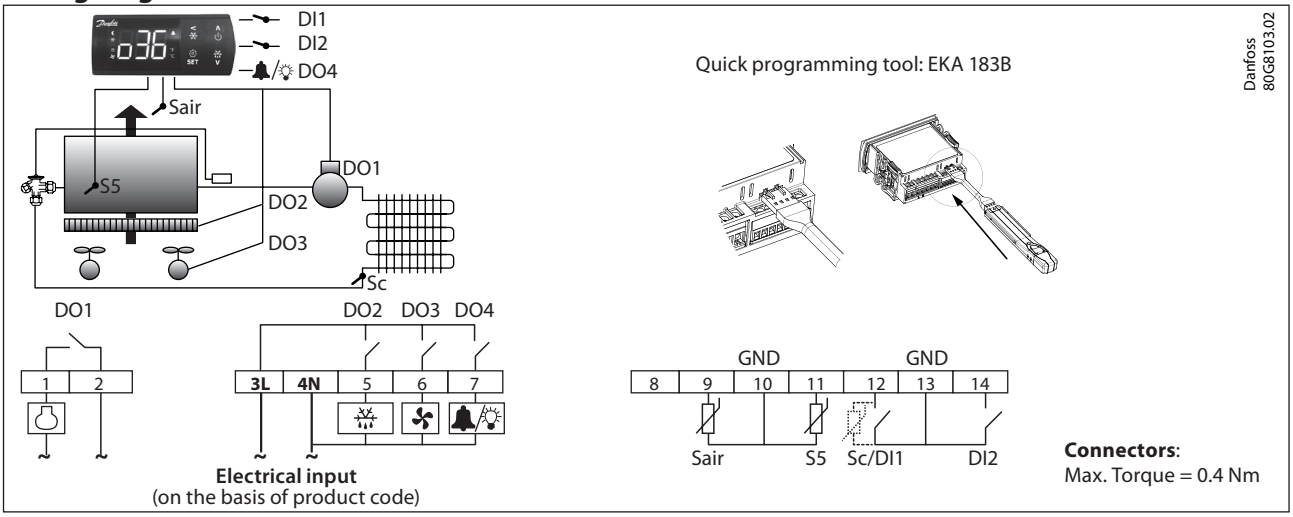
The **ERC 214** is a smart, multipurpose integrated refrigeration controller with temperature and defrost management, available with 4 relays.
This controller is for Operating temperature sensing control, suitable for refrigeration and heating applications.
Incorporated control has been designed to fulfil 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: **BACK** Press and hold down: **PULL-DOWN**	∧ ⏻	Press for one second: **UP** Press and hold down: **ON/OFF**
SET	Press for one second: **TEMPERATURE SETPOINT/OK** Press and hold down: **MENU**	❄ ∨	Press for one second: **DOWN** Press and hold down: **DEFROSTING**

Display icons					
☾	Night mode (energy saving)	Fan on		❄	Defrosting
❄	Compressor on Blinks in pull-down mode	🔔	Alarm activated	°C	Units (°C or °F)

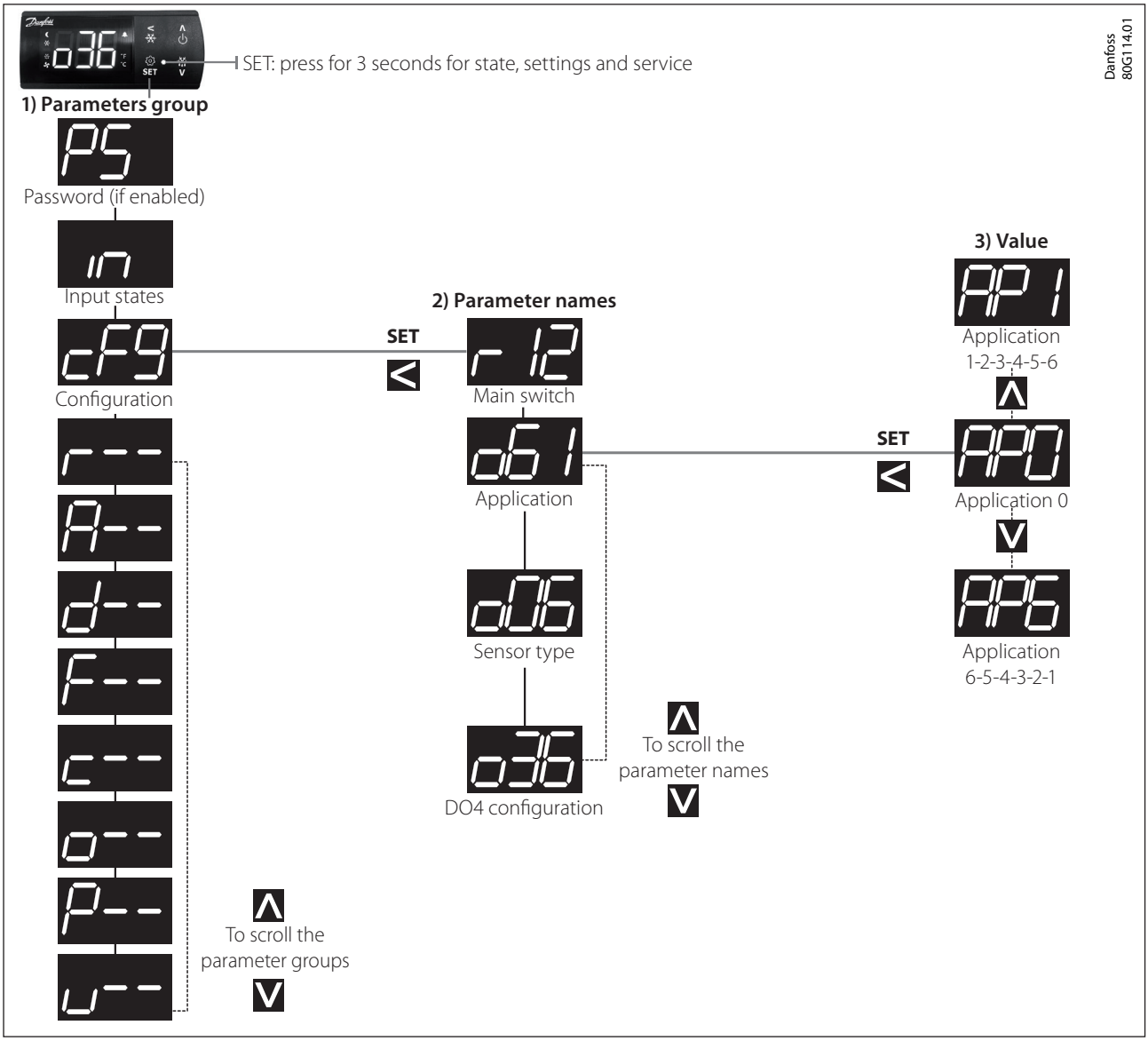
3 - Quick-start configuration

- **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 "*o61*"**
  The display automatically shows the application selection parameter "*o61*".
  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 ref. units (2 – 6 °C), with timed natural defrosting
App 2	Medium temperature ventilated ref. units (0 – 4 °C), with timed electric defrosting
App 3	Low temperature ventilated ref. units (-26 – -20 °C), with timed electric defrosting
App 4	Medium temperature ventilated ref. units (0 – 4 °C), with timed electric defrosting (on the basis of the temperature)
App 5	Low temperature ventilated ref. units (-26 – -20 °C), with timed electric defrosting (on the basis of the temperature)
App 6	None (no preset application) with simplified parameters 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 by the same type.
- **STEP 5: Configure output DO4 "*o36*"**
  The display automatically shows the parameter "*o36*" to configure the output "*DO4*".
  Select light ("*Lig*") or alarm ("*ALA*") on the basis of the application and press SET to confirm.
  The display is reset in normal display mode with the control on.

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*” and configuration “*O36*” DO4) in the “*cFg*” menu.

6 - Basic functions

Adjusting the setpoint temperature

(short press) **SET**: adjust the setpoint temperature.

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UP/DOWN: change the temperature setpoint (in setting mode the setpoint flashes).

SET: saves the temperature setpoint.

Initiate a manual defrost

DEFROST: press for 3 seconds to initiate a defsost.

DEFROST: press for 3 seconds to stop manual defrost.
The DEFROST icon is shown during 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

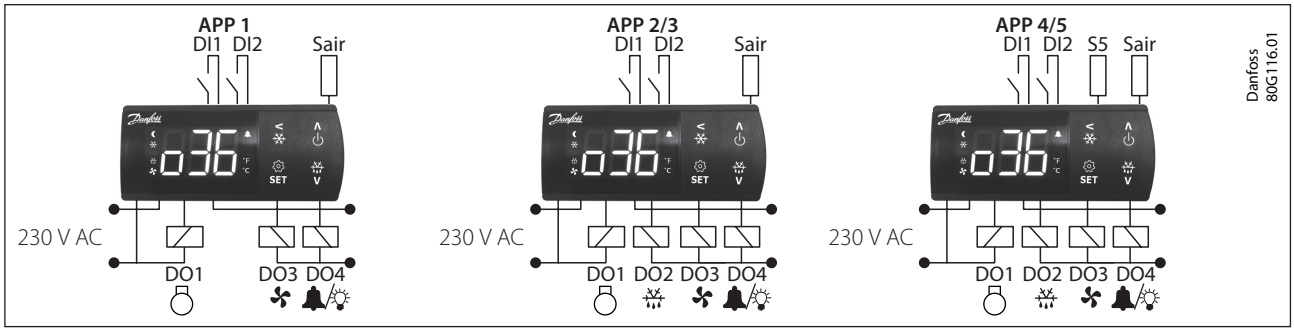
Temperature and alarm codes alternate flashes until the alarm is resolved.
The alarm bell is shown.

Unlock keyboard

- After 5 minutes of inactivity, the keypad will be locked (if P76 = YES).
- When the keypad is locked, if any key is selected, "*LoC*" appears on the display.
- Press **UP** and **DOWN** buttons simultaneously for 3 seconds to unlock the keyboard. "unl" is displayed for 3 seconds.

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)
	Regulator precision: +/-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
	Alarm / light relay DO4: 2:00 AM
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 214	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
DO4 configuration *Lig=light, ALA=alarm*	o36	Lig	ALA		Lig	Lig	Lig	Lig	Lig	Lig	Lig
Reference / thermostat	**r--**										
Temperature setpoint	r00	-100	200	C/F	2	4	2	-24	2	-24	2
Differential	r01	0.1	20	K	2	2	2	2	2	2	2
Min set point limitation	r02	-100	200	C/F	-35	2	0	-26	0	-26	-35
Max set point limitation	r03	-100	200	C/F	50	6	4	-20	4	-20	50
Offset display (temperature correction shown on display)	r04	-10	10	K	0	0	0	0	0	0	0
Display units (°C / °F)	r05	-C	-F		-C	-C	-C	-C	-C	-C	-C
Sair calibration (offset for air temperature calibration)	r09	-20	20	K	0	0	0	0	0	0	-
Main switch *-1=service, 0=OFF, 1=ON*	r12	-1	1		1	1	1	1	1	1	-
Night setback (offset temperature during night mode)	r13	-50	50	K	0	0	0	0	0	0	0
Thermostat reference displacement (temperature offset)	r40	-50	50	K	0	0	0	0	0	0	-
Pull-down duration	r96	0	960	min.	0	0	0	0	0	0	-
Pull-down temperature limit	r97	-100	200	C/F	0	0	0	0	0	0	-
Alarm	**A--**										
Delay for temperature alarm during normal conditions	A03	0	240	min	30	45	30	30	30	30	30
Temperature alarm delay pull-down / startup / defrosting duration	A12	0	240	min	60	90	60	60	60	60	60
High temperature alarm limit (Cabinet / Ambient)	A13	-100	200	C/F	8	10	8	-15	8	-15	8
Low temperature alarm limit	A14	-100	200	C/F	-30	0	-2	-30	-2	-30	-30
DI1 delay (delay for selected function DI1)	A27	0	240	min	30	30	30	30	30	30	30
DI2 delay (delay for selected function DI2)	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--**										
Defrosting method *no=no defrost, nAt=natural, EL=electric, gAS=hot gas*	d01	no	gAS		EL	*nAt*	*EL*	*EL*	*EL*	*EL*	EL
Defrost stop temperature	d02	0	50	C/F	6	-	-	-	6	6	6
Defrost interval	d03	0	240	hours	8	6	8	12	8	12	8
N.B.: hidden parameters are greyed out											

Parameter name - ERC 214	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	C/F	-5	-	-	-	-5	-5	-
Fan during defrost	d09	oFF	on		on	*on*	*on*	*on*	on	on	on
Defrost stop sensor *non=timed, 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 demand *20.0=OFF*	d19	0	20	K	20	-	-	-	20	20	-
Defrost delay after pull-down *0=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 pulsation*	F01	FFc	FPL		FAo	FAo	FAo	FAo	FAo	FAo	FAo
Fan stop evaporator temperature *50.0=OFF*	F04	-50	50	C/F	50	-	-	-	50	50	-
Fan cycle ON	F07	0	15	min	2	2	2	2	2	2	*2*
Fan cycle OFF	F08	0	15	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 with 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*
Others	**o--**										
Delay of outputs at 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	0
Select sensor type *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		0.1	0.1	0.1	0.1	0.1	0.1	*0.1*
Relay 1 counter (1 count = 100 operating cycles)	o23	0	999		0	0	0	0	0	0	-
N.B.: hidden parameters are greyed out											

Parameter name - ERC 214	Code	Min.	Max.	Unit	App. 0 (Def.)	App. 1	App. 2	App. 3	App. 4	App. 5	App. 6
Relay 2 counter (1 count = 100 operating cycles)	o24	0	999		0	0	0	0	0	0	-
Relay 3 counter (1 count = 100 operating cycles)	o25	0	999		0	0	0	0	0	0	-
Relay 4 counter (1 count = 100 operating cycles)	o26	0	999		0	0	0	0	0	0	-
DO4 configuration *ALA=alarm, Lig=light*	o36	ALA	Lig		Lig	Lig	Lig	Lig	Lig	Lig	-
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
Lights control *on=always on, dAn=day / night, doo=on basis of door action*	o38	on	doo		on	on	on	on	on	on	on
Predefined applications	o61	AP0	AP6		AP0	*AP1*	*AP2*	*AP3*	*AP4*	*AP5*	-
Save settings as default WARNING: previous default settings will be overwritten	o67	no	yes		no	no	no	no	no	no	-
Display at defrost *Air=effective air temperature, FrE=freezing 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 relay *0=normal, 1=relay action inversion*	P75	0	1		0	0	0	0	0	0	-
Keyboard lock enable	P76	no	yes		no	no	no	no	no	no	-
Readouts	**u--**										
Controller status *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		--						
Air temperature (Sair)	U01	-100	200	C/F	---						
Read the present regulation reference	u02	-100	200	C/F	---						
Defrost temperature (S5)	u09	-100	200	C/F	---	-	-	-			
N.B.: hidden parameters are greyed out											

Parameter name - ERC 214	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	200	C/F	---						
Compressor relay status	u58	oFF	on		---						
Fan relay status	u59	oFF	on		---						
Defrost relay status	u60	oFF	on		---						
Alarm relay status	u62	oFF	on		---						
Light relay status	u63	oFF	on		---						
Firmware version readout	u80	0	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										
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

Contact info.:
www.danfoss.com/erc