ENGINEERING TOMORROW

Installation Guide

080R9313

AN19438642116105-000401

Electronic refrigeration control Type **ERC 213**

ENGLISH

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

1. Technical Highlights

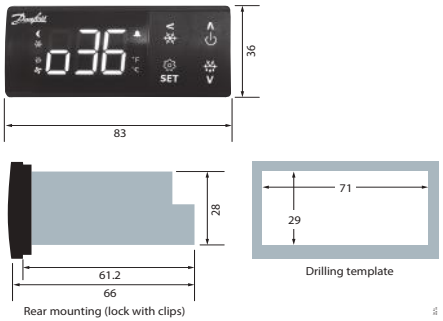
- *Ease of use:* Four buttons, easy menu structure, pre-installed application solutions ensure superior usability
- *Simple installation:* High performance 16 A relay enable direct connection of heavy loads, such as 2 hp compressors, without use of intermediate relays. A wide range of compatible types 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, day/night mode and smart evaporator fan management ensure energy efficiency.

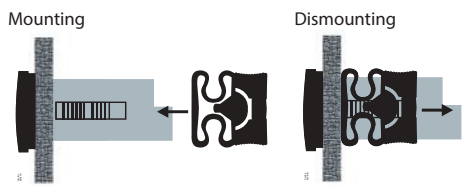
2. User Interface

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	Set point change or OK: Short press (less than 1 sec.) Enter Menu: Press and hold (~ 3 secs.)

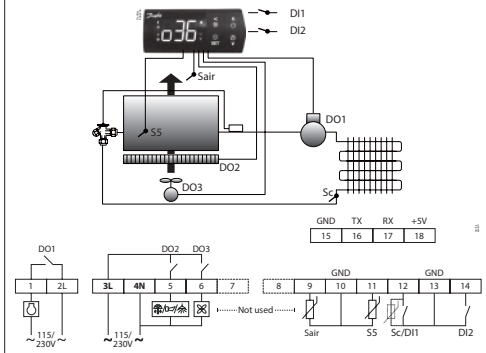
Display Icons	
	Night mode (Energy saving)
	Fan running
	Compressor running (Flashes in pull-down mode)
	Active alarm
	Defrost
°C	Unit (°C or °F)

3. Dimensions (mm) and mounting





4. 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

5. 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".

APP	Description	Temp. range	Defrost end	DO1	DO2	DO3	AI1	AI2	DI1[1)]	DI2[1)]
AP0	Fully Configurable Standard Application (Cooling / Heating)									
AP1	MT, Natural defrost, Alarm, Fan	2 – 6 °C	By time				Sair	NC	DI1/Sc	DI2
AP2	MT, Electrical defrost, Fan	0 – 4 °C	By time				Sair	NC	DI1/Sc	DI2
AP3	LT, Electrical defrost, Fan	-24 – -18 °C	By time				Sair	NC	DI1/Sc	DI2
AP4	MT, Electrical defrost, Fan	0 – 4 °C	By temp (S5)				Sair	S5	DI1/Sc	DI2
AP5	LT, Electrical defrost, Fan	-26 – -20 °C	By temp (S5)				Sair	S5	DI1/Sc	DI2
AP6	Fully configurable simplified application (Cooling / Heating)									
AP7	Heating Thermostat	30 – 70 °C	NA				Sair	NC	DI1	DI2

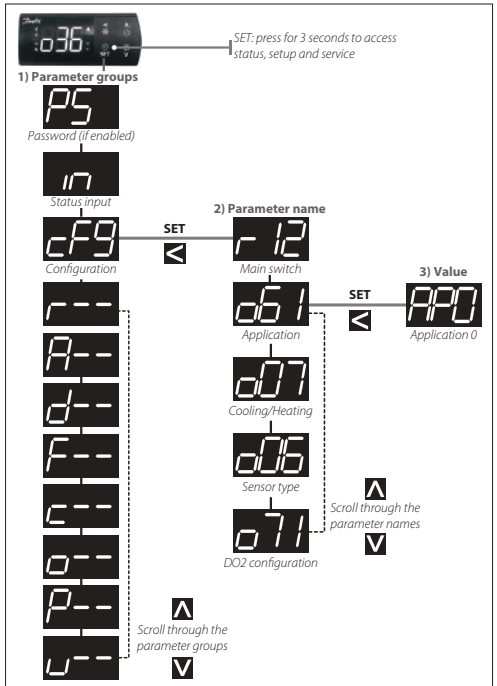
[1)] The digital inputs DI1 and DI2 can be configured for multiple functions (refer Parameters "o02" and "o37").
NC = Not configured

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).

- **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.

- **STEP 5: configure DO2 output "o71"**
  The display automatically shows the "o71" parameter to configure "DO2" output. Select 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.



6. 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 "071 DO2 configuration" and select the function associated to DO2 output and press "SET".
10. Open the "o02 DI1 Configuration" and select the function associated to digital input 1 (Press "SET").
11. Open the "o37 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.

7. 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 - Relay 1: 16 A, 16 (16) A, EN 60730 10 FLA/60 LRA at 230 V, UL60730 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)
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 used with AKS 12 sensor

8. Parameter List

Function	Code	Min	Max	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Configuration	**cFg**										
Main switch (-1=Service 0=OFF, 1=ON,)	r12	-1	1	1	1	1	1	1	1	1	1
Predefined applications	o61[2]	AP0	AP7	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Cooling/Heating (rE=Cooling, Ht= Heating)	o07[2]	rE	Ht	rE	rE[1]	rE[1]	rE[1]	rE[1]	rE[1]	rE	Ht[1]
Sensor type (n5=NTC 5K, n10=NTC10K, ptc=PTC, pt1=PT1000)	o06[2]	n5	ptc	n10	n10	n10	n10	n10	n10	n10	n10
DO2 config (dEF=Defrost; ALA=alarm; Lig=Light)	o71[2]	dEF	Lig	dEF	ALA[1]	dEF[1]	dEF[1]	dEF[1]	dEF[1]	dEF	ALA
Reference	**r--**										
Setpoint (unit: °C)	r00	-100	200	2	4	2	-20	2	-24	2	50
Differential (unit: K)	r01	0.1	20	2	2	2	2	2	2	2	4
Maximum set point 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 offset (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 (unit: K)	r13	-50	50	0	0	0	0	0	0	0	0
Reference displacement offset 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 temperature (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	Max	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Alarm	**A--**										
Delay for temp alarm during normal conditions (unit: min)	A03	0	240	30	45	30	30	30	30	30	10
Delay for temp alarm during pull-down/start up/defrost (unit: min)	A12	0	240	60	90	60	60	60	60	60	-
High temp. alarm limit (unit: °C)	A13	-100	200	8	10	8	-15	8	-15	8	80
Low temp. alarm limit (unit: °C)	A14	-100	200	-30	0	-2	-30	-2	-30	-30	20
DI1 delay (Time delay for selected DI1 function) (unit: min)	A27	0	240	30	30	30	30	30	30	30	30
DI2 delay (Time delay for selected DI2 function) (unit: min)	A28	0	240	30	30	30	30	30	30	30	30
Condenser High alarm limit (unit: °C)	A37	0	200	80	80	80	80	80	80	-	-
Condenser High block limit (unit: °C)	A54	0	200	85	85	85	85	85	85	-	-
Voltage protection enable	A72	no	YES	no	no	no	no	no	no	no	no
Minimum cut-in voltage (unit: V)	A73	0	270	0	0	0	0	0	0	0	0
Minimum cut-out voltage (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 (no=None, nAt=Natural, EL = Electric; gAS=Hot gas)	d01	no	gAS	EL	nAt	EL	EL	EL	EL	EL	-
Defrost stop temperature (unit: °C)	d02	0	50	6	-	-	-	6	6	6	-

[1] 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 (unit: 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 power up (unit: min)	d05	0	240	0	0	0	0	0	0	NA	-
Drip delay (unit: min)	d06	0	60	0	0	0	0	0	0	2[1]	-
Fan delay after defrost (unit: min)	d07	0	60	0	0	0	0	0	0	5[1]	-
Fan start temperature after defrost (unit: °C)	d08	-50	50	-5	50[1]	50[1]	50[1]	-5	-5	-	-
Fan during defrost	d09	OFF	on	on	on	OFF	OFF	OFF	OFF	OFF	-
Defrost stop sensor non=None (Time), 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 runtime to start defrost (0=OFF) (unit: hour)	d18	0	96	0	0	0	0	0	0	-	-
Defrost on demand (20=OFF) (unit: K)	d19	0	20	20	20[1]	20[1]	20[1]	20	20	-	-
Defrost delay after pull down cycle (unit: min)	d30	0	960	0	0	0	0	0	0	-	-
Fan control	**F--**										
Fan at compressor cutout (FAo=Fan always ON; FFC=Fan follow compressor; FPL= Fan Pulsating)	F01	Fao	FPL	FAo	FAo	FAo	FAo	FAo	FAo	FAo	FAo
Fan stop evap. Temperature (unit: °C)	F04	-50	50	50	-	-	-	50	50	50	-
Fan ON Cycle (unit: min)	F07	0	180	2	2	2	2	2	2	2[1]	2
Fan OFF cycle (unit: min)	F08	0	180	2	2	2	2	2	2	2[1]	2

[1] 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--**										
Compressor / Heater minimum ON time (unit: min)	C01	0	30	0	0	0	0	0	0	0	0
Compressor /Heater minimum OFF time (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 selection (YES / no)	C70	no	YES	YES	YES	YES	YES	YES	YES	YES[1]	YES
Others	**o--**										
Delay of outputs at startup (unit: sec)	o01	0	600	10	10	10	10	10	10	10[1]	10
DI1 configuration	o02	nC	Sc	nC	nC	nC	nC	nC	nC	nC	nC
Serial address (unit: No)	o03	0	247	0	0	0	0	0	0	-	0
Password (unit: No)	o05	0	999	0	0	0	0	0	0	0	0
Sensor type (n5=NTC 5K, n10=NTC10K, ptc=PTC, pt1=PT1000)	o06[2]	n5	ptc	n10	n10	n10	n10	n10	n10	n10	n10
Cooling/Heating (rE=Cooling, Ht= Heating)	o07[2]	rE	Ht	rE	rE[1]	rE[1]	rE[1]	rE[1]	rE[1]	rE	Ht[1]
Display Resolution	o15	0.1	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1[1]	0.1
DI2 configuration	o37	nC	Pud	nC	nC	nC	nC	nC	nC	nC	nC
Light Control on= Always on, dAn = Day/Night, doo=Based on door action	o38	on	doo	on	on	on	on	on	on	on	on
Predefined applications	o61[2]	AP0	AP7	AP0	AP1	AP2	AP3	AP4	AP5	AP6	AP7
Save settings as factory WARNING: The earlier factory settings are overwritten	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 config (dEF=Defrost; ALA=alarm; Lig=Light)	o71[2]	dEF	Lig	dEF	ALA[1]	dEF[1]	dEF[1]	dEF[1]	dEF[1]	dEF	ALA
Display during defrost Air=actual air temperature, FrE=freezed temperature, -d-="-d-" is displayed	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 displasement, 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 = normally open, nc = normally closed	P73	no	nc	no	no	no	no	no	no	no	no
DI2 input polarity (nc / no) no = normally open, nc = normally closed	P74	no	nc	no	no	no	no	no	no	no	no
Invert alarm relay (0= normal, 1= invert relay action)	P75	0	1	0	0	0	0	0	0	-	0
Key board lock (no / 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 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 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"

[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

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