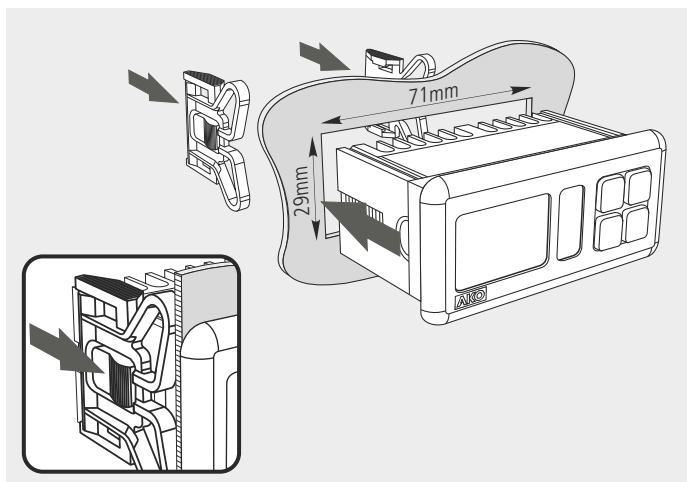**AKO**
we make it easy

CE AKO-D14323-F0001 Installation instructions

1- Warnings

- Using the unit not observing the manufacturer's instructions may alter the appliance's safety requirements. Only probes supplied by AKO should be used for the appliance to operate correctly.
- The unit should be installed in a place protected from vibrations, water and corrosive gases, where the ambient temperature does not exceed the value indicated in the technical data.
- For the reading to be correct, the probe should be used in a place without heat influences apart from the temperature you want to measure or control.
- The power circuit should be equipped with a switch for its disconnection of at least 2 A, situated near to the appliance. The cables will enter the back of the unit and will be H05VV-F or H05V-K.
- The section to be used will depend on current local regulations, but should never be less than 1 mm^2.
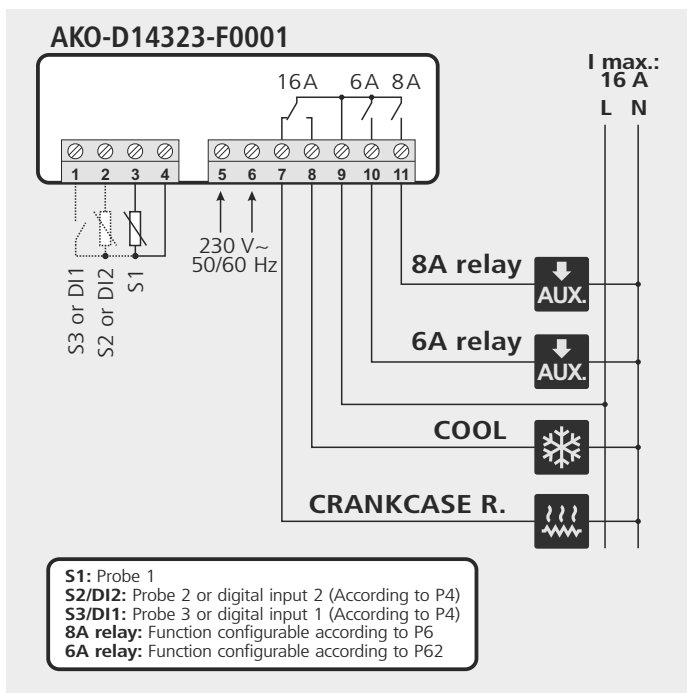- Cables for relay contact wiring should have a section of 1 mm^2 to 2,5 mm^2.

ATTENTION: This unit is not compatible with **AKO-14917** (External Communication Module) and **AKO-14918** (Programming Key).
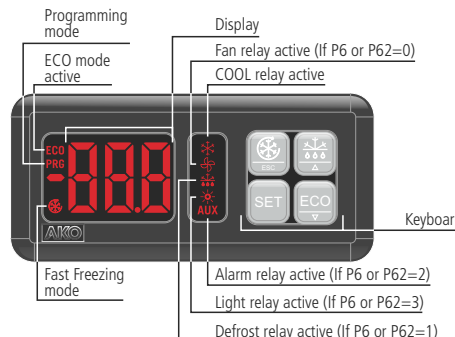
2- Installation

3- Wiring

The probe and its cable should **NEVER** be installed in a conduit together with power, control or feeder cables.

AKO-D14323-F0001

I max.: 16 A
L N

16A 6A 8A

1 2 3 4   5 6 7 8 9 10 11

S3 or DI1
S2 or DI2
S1

230 V~
50/60 Hz

8A relay AUX.
6A relay AUX.
COOL
CRANKCASE R.

S1: Probe 1
S2/DI2: Probe 2 or digital input 2 (According to P4)
S3/DI1: Probe 3 or digital input 1 (According to P4)
8A relay: Function configurable according to P6
6A relay: Function configurable according to P62

4- Operation

Programming mode
ECO mode active
Display
Fan relay active (If P6 or P62=0)
COOL relay active
Keyboard
Fast Freezing mode
Alarm relay active (If P6 or P62=2)
Light relay active (If P6 or P62=3)
Defrost relay active (If P6 or P62=1)

ESC key / ⊛
- Pressing it for 5 seconds starts/stops the Fast Freezing mode.
- In the programming menu, exit without saving parameter, return to previous level or exit programming.

SET key
- Pressing it for 5 seconds allows changing the SP set point.
- Pressing it for 10 seconds accesses the programming menu.
- In the programming menu, it accesses the level shown on the display or, during the setting of a parameter accepts the new value.

Up key ▲ / ❄
- Pressing it for 5 seconds starts/stops the defrost.
- In the programming menu it allows scrolling around the different values, or during the setting of a parameter, changing its value.
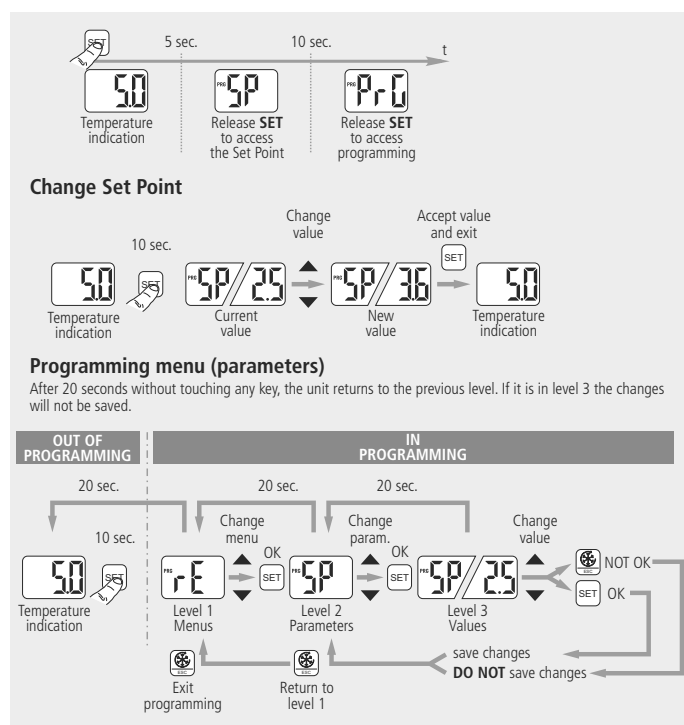
Down key ▼ / ECO
- Pressing it for 5 seconds activates the **ECO-1** mode. This mode can also be activated by inactivity in door contact (P10 or P11=1). The **ECO-2** mode will activate after a time set by parameter C13.
  The unit will exit the **ECO 1 / 2** mode when this key is pressed again for 5 seconds, on detecting two door openings in the time set by C11, or if the door stays open for more than 15 seconds.
  The different activation modes are controlled with parameter C15.
- In the programming menu it allows scrolling around the different levels, or during the setting of a parameter, changing its value.

4.1- Access to set point and to programming

5 sec.   10 sec.   t

5.0
Temperature indication

SP
Release **SET** to access the Set Point

PrG
Release **SET** to access programming

Change Set Point

5.0
Temperature indication

10 sec.

SP/25
Current value

Change value

SP/36
New value

Accept value and exit

5.0
Temperature indication

Programming menu (parameters)
After 20 seconds without touching any key, the unit returns to the previous level. If it is in level 3 the changes will not be saved.

OUT OF PROGRAMMING	IN PROGRAMMING

20 sec.   20 sec.   20 sec.

10 sec.

5.0
Temperature indication

rE
Level 1 Menus

Change menu

SP
Level 2 Parameters

Change param.

SP/25
Level 3 Values

Change value

NOT OK
OK

Exit programming
Return to level 1

save changes
DO NOT save changes

6- Parameter and message table

The **Def.** column indicates factory-set default parameters. Parameters marked with **∗** , are variable parameters depending on the application selected in the wizard or in parameter P3 (see table "Default parameters according to application"). Unless otherwise indicated, the temperature values are expressed in °C.

Level 1		Menus and description				
rE	Level 2		Control			
		Level 3	Description	Values	Min.	Def.	Max.

		Level 3	Description	Values	Min.	Def.	Max.
		SP	Temperature setting (Set Point)	(°C/°F)	-50 (-58°F)	∗	99 (210°F)
		C0	Probe 1 calibration (Offset)	(°C/°F)	-20.0	0.0	20.0
		C1	Probe 1 differential (Hysteresis)	(°C/°F)	0.1	2.0	20.0
		C2	Set Point upper blocking (it cannot be set above this value)	(°C/°F)	C3	99 (210°F)	99 (210°F)
		C3	Set Point lower blocking (it cannot be set below this value)	(°C/°F)	-50 (-58°F)	-50 (-58°F)	C2
		C4	Type of delay to protect the compressor (COOL relay): **0**=OFF/ON (From last connection); **1**=ON (From start-up/reset); **2**=OFF-ON/ON-OFF (From last stop/start)		0	0	2
		C5	Protection delay time (Value of the option selected in parameter C4) (min.)		0	0	120
		C6	COOL relay status with fault in probe 1 **0**=OFF; **1**=ON; **2**=Average according to last 24 h before the probe error; **3**=ON-OFF according prog. C7 and C8		0	0	3
		C7	Time of relay in ON in the event of damaged 1 probe (If C7=0 and C8≠0, the relay will always be in OFF disconnected) (min.)		0	10	120
		C8	Time of relay in OFF in the event of damaged 1 probe (If C8=0 and C7≠0, the relay will always be ON connected) (min.)		0	5	120
		C9	Maximum duration of the fast freezing mode. (**0**=deactivated) (h.)		0	24	48
		C10	Variation of the set point (SP) in fast freezing mode, when it reaches this point (SP+C10), it returns to the normal mode. (SP+C10≥C3) (**0**=OFF) The value of this parameter is always negative, except if it is 0.	(°C/°F)	0	-50 (-58°F)	C3-SP
		C11	Time of inactivity in the digital input to activate the ECO1 mode (Only if P10 or P11=1) (**0**=OFF) (h.)		0	2	24
		C12	Variation of the set point (SP) in ECO1 mode (SP+C12≤ C2) (**0**= deactivated) (°C/°F)		0	2	C2-SP
		C13	Time past in ECO 1 mode to enter into ECO 2 mode (h.)		0	3	24
		C14	Variation of the set point in ECO 2 mode (SP+C12+C14≤ C2) (°C/°F)		0	2	C2-(SP+C12)
		C15	Activation of the ECO mode: **0**=Manual/Automatic; **1**=Only manual **2**=Only automatic; **3**=Deactivated		0	0	3
		EP	Exit to level 1				

dEF	Level 2		DEFROST control				
		Level 3	Description	Values	Min.	Def.	Max.
		d0	Defrost frequency (Time between 2 starts) (h.)		0	∗	96
		d1	Maximum defrost duration (**0**=defrost deactivated) (min.)		0	∗	255
		d2	Type of message during the defrost: **0**=Sign of the real temperature; **1**=Sign of the temperature at the start of the defrost; **2**=Sample of the dEF message		0	∗	2
		d3	Maximum duration of the message (Time added at the end of the defrost) (min.)		0	5	255
		d4	Final defrost temperature (by evaporator probe) (°C/°F)		-50 (-58°F)	8	99 (210°F)
		d5	Defrost on connecting the unit: **0**=NO First defrost according to d0; **1**=YES, First defrost according to d6		0	0	1
		d6	Delay of the defrost start on connecting the unit (min.)		0	0	255
		d7	Type of defrost: **0**=Resistors; **1**=cycle inversion or hot gas; **2**=fan/air (It is necessary that P6 or P62=0); **3**= compressor stop.		0	0	3
		d8	Count of time between defrost periods: **0**=Total real time; **1**= Sum of compressor connected time		0	0	1
		d9	Drip time when a defrost finishes (Compressor and fan stop) (min.)		0	1	255
		EP	Exit to level 1				

FAn	Level 2		FAN control (Evaporator) P6 or P62 should be configured at 0				
		Level 3	Description	Values	Min.	Def.	Max.
		F0	Stop temperature of the fans by evaporator probe (°C/°F)		-50 (-58°F)	∗	99 (210°F)
		F1	Evaporator probe differential (°C/°F)		0,1	2,0	20,0
		F2	Stop fans when the compressor stops **0**=No; **1**=Yes		0	∗	1
		F3	Status of the fans during the defrost **0**=Stopped; **1**=Running		0	∗	1
		F4	Delay of start-up after defrost (if F3=0) It will only actuate if it is higher than d9. (min.)		0	3	99
		F5	Stop fans on opening the door **0**=No; **1**=Yes (Requires a digital input configured as door P10 or P11=1).		0	0	1
		EP	Exit to level 1				

AL	Level 2		ALARM control				
		Level 3	Description	Values	Min.	Def.	Max.
		A0	Configuration of the temperature alarms **0**=Relative to SP; **1**=Absolute		0	0	1
		A1	Alarm for maximum in probe 1 (It should be higher than the SP) (°C/°F)		A2	99,9 (211°F)	99,9 (211°F)
		A2	Alarm for minimum in probe 1 (It should be lower than the SP) (°C/°F)		-50 (-58°F)	-50 (-58°F)	A1
		A3	Delay of temperature alarms in the start-up (min.)		0	0	120
		A4	Delay of temperature alarms from the end of a defrost (min.)		0	0	99
		A5	Delay of temperature alarms from when the A1 or A2 value is reached. (min.)		0	30	99
		A6	Delay of the external alarm on receiving a signal in digital input (P10 or P11=2 or 3) (min.)		0	0	120
		A7	Delay of deactivation of external alarm when the signal disappears in digital input (P10 or P11=2 or 3) (min.)		0	0	120
		A8	Show warning if the defrost ends for maximum time **0**=No; **1**=Yes		0	0	1
		A9	Polarity relay alarm **0**= Relay ON in alarm (OFF without alarm); **1**= Relay OFF in alarm (ON without alarm)		0	0	1
		A10	Differential temperature alarms (A1, A2 and A13) (°C/°F)		0,1	1,0	20,0
		A12	Delay of open door alarm (If P10 or P11 = 1) (min.)		0	2	120
		A13	Maximum temperature alarm due to dirty condenser (P17 or P18=1) (**0**=Alarm deactivated) (°C/°F)		0	85	99,9 (211°F)
		A14	Slow cooling alarm. Minimum acceptable value of temperature drop in probe 1 expressed in thousandths of a degree per minute. (**0**=Alarm deactivated)		0	1	999
		EP	Exit to level 1				

CnF	Level 2		General status				
		Level 3	Description	Values	Min.	Def.	Max.
		P1	Delay of all functions on receiving power supply (min.)		0	0	255
		P2	Access code (password) to the set point and parameters **0**= Inactive; **1**= Active (L5)		0	0	1
		P2	Keypad operation: **0** and **1**=Normal operation **2** and **3**=Access to Programming with password locked (L5) **4** and **5**=Access to Programming and Set Point with password locked (L5) **6** and **7**=Total locking of the keypad with password (L5)		0	0	7
		P3	Configures the default parameters according to the type of application (see attached table) **0**=Customised parameters **1**=Varied product **2**=Frozen food **3**=Fruit and vegetables **4**=Fresh fish **5**=Soft drinks **6**=Bottle racks **7**=Air conditioning **8**=Heat/Incubators		0	0	8
		P4	Selection of type of inputs **1**=1 probe + 2 digital inputs; **2**=2 probes+1 digital input; **3**=3 probes		1	1	3
		P5	Address (Only units with built-in communication)		0	1	255
		P6	Configuration of the 8A relay **0**=Fan **1**=Defrost **2**=Alarm **3**=Light		0	1	3
		P62	Configuration of the 6A relay **0**=Fan **1**=Defrost **2**=Alarm **3**=Light		0	1	3
		P7	Temperature display mode **0**=Integers in °C **1**=A decimal in °C **2**=Integers in °F **3**=A decimal in °F		0	1	3
		P8	Probe to be displayed (According to parameter P4) **0**=All active probes (sequential mode) **1**=Probe 1; **2**=Probe 2; **3**=Probe 3		0	1	3
		P10	Configuration of digital input 1 **0**=Deactivated **1**=Door contact **2**=External alarm **3**=Severe external al. **4**=Slave defrost **5**=ECO mode act. **6**=Fast freezing act. (If C9 ≠ 0)		0	0	6
		P11	Configuration of digital input 2 **0**=Deactivated **1**=Door contact **2**=External alarm **3**=Severe external al. **4**=Slave defrost **5**=ECO mode act. **6**=Fast freezing act. (If C9 ≠ 0)		0	0	6
		P12	Polarity of the digital input 1 **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
		P13	Polarity of the digital input 2 **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
		P16	Probe 1 function **0**=Environment; **1**=Evaporator (Only if P17=1)		0	0	1
		P17	Probe 2 function (Only if P16=0); **0**=Evaporator (Only if P18=0); **1**=Condenser		0	0	1
		P18	Probe 3 function **0**=Product; **1**=Condenser (Only if P17=0)		0	0	1
		P19	Light operation in the ECO 1 mode (Only if P6 or P62=3) **0**=On; **1**=Stand by (They will turn on when the door is opened and they will turn off 10 seconds after closing it)		0	0	1
		EP	Exit to level 1				

tid	Level 2		Access control and Information				
		Level 3	Description	Values	Min.	Def.	Max.
		L5	Access code (Password) to parameters and information		0		99
		PU	Programme version (Information)			-	
		Pr	Programme revision (Information)			-	
		EP	Exit to level 1				
EP	Exit programming						

ATTENTION: The default parameters according to application type have been defined for the most common applications. Check that these parameters correspond to your facilities.

DEFAULT PARAMETERS, DEPENDING ON APPLICATION (P3)

	0 Customised parameters	1 Varied product	2 Frozen food	3 Fruit and vegetables	4 Fresh fish	5 Soft drinks	6 Bottle racks	7 Air conditioning	8 Heat/Incubators
SP	2 (35,6°F)	2 (35,6°F)	-18 (-0,4°F)	10 (50°F)	0 (32°F)	3 (37,4°F)	12 (53,6°F)	21 (69,8°F)	37 (98,6°F)
d0	4	4	4	4	4	24	24	96	-
d1	20	20	20	20	20	20	20	0	-
d2	1	2	2	2	2	2	2	2	-
F0	20	8	0	30	8	8	30	99	-
F2	0	1	1	1	1	1	1	1	-
F3	1	1	0	1	1	1	1	0	-

MESSAGES				
L5	Access code (Password) request		D	
dEF	Indicates that a defrost is being performed. (Only if the parameter d2=2)		D	
E1	Probe 1 damaged (Circuit open, crossed, temp.> 99 °C or temp.<-50 °C)(Equivalent limits in °F)	B	D	A
E2	Probe 2 damaged (Circuit open, crossed, temp.> 99 °C or temp.<-50 °C)(Equivalent limits in °F)	B	D	A
E3	Probe 3 damaged (Circuit open, crossed, temp.> 99 °C or temp.<-50 °C)(Equivalent limits in °F)	B	D	A
AH	**Intermittent:** Maximum temperature alarm in probe 1 (A1)	B	D	A
AL	**Intermittent:** Minimum temperature alarm in probe 1 (A2)	B	D	A
AE	External alarm activated (Only if parameter P10 or P11=2)	B	D	A
AES	Severe external alarm activated (Only if parameter P10 or P11=3)	B	D	A
Adt	Defrost alarm ended by time (Only if A8=1)		D	
ACS	Dirty condenser alarm. This alarm stops the compressor and fans	B	D	A
EnL	Slow cooling alarm.		D	A
PAb	Open door alarm (Only if P10 or P11=1 and according to time in A12)	B	D	

D: Shows the message on the display, **A:** Activates the alarm relay (If it is available), **B:** Emits an alarm sound in the unit.

7- Defrost by hot gas bypass

This function allows controlling, via the defrost relay, a valve that reverses the cold generation cycle or a valve that introduces hot gas from the compressor in the evaporator.
Both the COOL relay (compressor) and defrost relay (according to P6 or P62 parameter) will be active if this mode is active (d7=1).
Both the COOL relay and the defrost relay will remain inactive during the drip time (d9).

8- Technical specifications

Power supply . . . . 230 V~ ±10% 50/60 Hz 3.75 VA
Inputs (configurable with parameter P4). . . . . 3 NTC inputs
. . . . 2 NTC inputs and 1 digital input
. . . . 1 NTC inputs and 2 digital inputs
COOL 16 A relay . . . . (EN60730-1: 12(9) A 250 V~)
6 A relay. . . . . (EN60730-1: 5(4) A 250 V~)
8 A relay. . . . . (EN60730-1: 8(4) A 250 V~)
No. of relay operations . . . . EN60730-1: 100.000 operations
Types of probes. . . . . NTC **AKO-149xx**
Measuring range . . . . -50,0 °C to +99,9 °C (-58,0 °F to 211 °F)
Resolution. . . . . 0,1 °C
Working environment . . . . -10 to 50 °C, <90 % humidity
Storage environment . . . . -30 to 70 °C, <90 % humidity
Protection degree of the front part. IP65
Fixing . . . . Panel mounting with anchors
Panel cavity dimensions . . . . 71 x 29 mm
Front part dimensions . . . . 79 x 38 mm
Depth . . . . 61 mm
Wiring . . . . Terminal to screw for cables with a section of up to 2.5 mm^2
Control device classification: Built-in assembly, with Type 1.B automatic operation action feature, for use in clean situations, logical support (Software) class A and continuous operation.
Contamination degree 2 acc/ UNE-EN 60730-1.
Double power input insulation, secondary circuit and relay output.
Rated pulse voltage . . . . 2500 V
Pressure ball test temperature   Accessible parts . . . . 75 °C
                               Parts that position active elements. . . . . 125 °C
Voltage and current declared by the EMC tests . . . . 207 V, 17 mA
Radio interference suppression test current. . . . . 270 mA
Compatible with **AKO-D14918** programming key.