

Installation instructions



AKO-D14120 AKO-D14123 AKO-D14012
AKO-D14023 AKO-D14023-C AKO-D14024
AKO-D14124 AKO-D14125

1- Warnings

-Using the equipment without following the manufacturer's instructions may affect the device's safety requirements. To ensure that the device operates correctly, only probes supplied by AKO should be used.

-The unit must be installed in a location protected from vibrations, water and corrosive gases, where the ambient temperature does not exceed that shown in the technical data.

-To ensure a correct reading, the probe must be situated in a location without any external heat influences except for the temperature which is being measured or controlled.

-The power supply circuit must be provided with a main switch rated at least 2A, 230V, located close to the equipment. The cables will enter through the back and should be type H05VV-F or H05V-K.

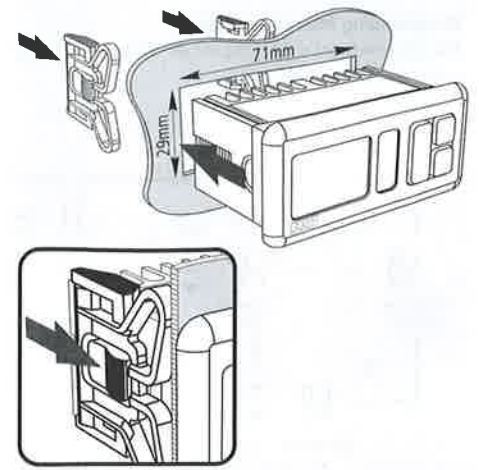
-The gauge will depend on local regulations, but should in no case be less than 1 mm².

-Connecting wires for the relay contacts should be sized 2.5 mm².

-Between -40 °C and +20 °C, if the probe NTC is prolonged till 1.000 m with a minimum of cable 0,5 mm², the maximum deviation will be of 0,25 °C (extension cable for probe ref. AKO-15586)

NOTE: Equipment not compatible with AKO-14917 (external communication module) and AKO-14918 (programming key)

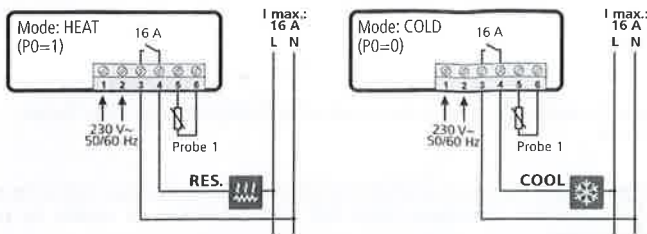
2- Installation



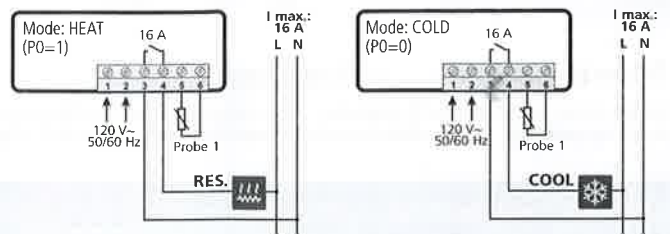
3- Wiring

The probe and its cable should **NEVER** be installed in the same conduit as power, control or supply cables.

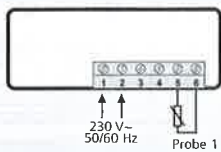
AKO-D14123, AKO-D14124, AKO-D14125



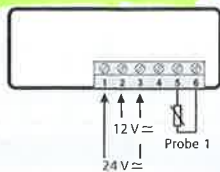
AKO-D14120



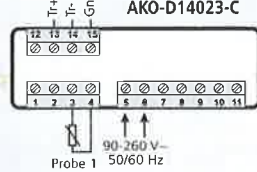
AKO-D14023, AKO-D14024



AKO-D14012

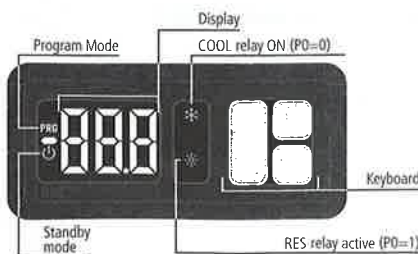


Modbus AKO-D14023-C



4- Operation

3 key equipment



SET key

Press for 5 seconds to modify the set point (SP).

Press for 10 seconds to go to the programming menu.

In the programming menu, go to the level displayed or accept the new value while setting a parameter.

Up key

Pressing for 5 seconds starts/stops defrosting.

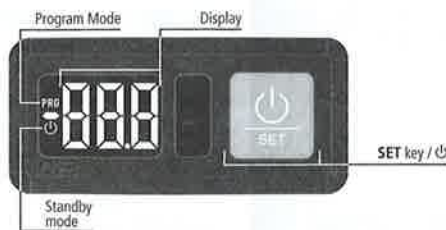
In programming menu, allows you to scroll through the various levels or, during the setting of a parameter, to change the value.

Down key

Pressing for 5 seconds activates Standby mode, pressing for 2 seconds returns the equipment to normal mode. In Standby mode, the equipment performs no actions and only the ⏻ indicator is displayed on the screen.

In programming menu, allows you to scroll through the various levels or, during the setting of a parameter, to change the value.

1 key equipment



SET key

Pressing for 5 seconds activates Standby mode, pressing for 2 seconds returns the equipment to normal mode. In Standby mode, the equipment performs no actions and only the ⏻ indicator is displayed on the screen.

Pressing for 10 seconds goes to the programming menu.

Pressing for 5 seconds in the programming menu goes to the level displayed on the screen or, during the setting of a parameter, accepts the new value.

In the programming menu, a short press allows you to scroll through the various levels or, during the setting of a parameter, to increase the value. When upper limit is reached, it will start again from the lower limit.

5- Start-up

(Only 3 key models)

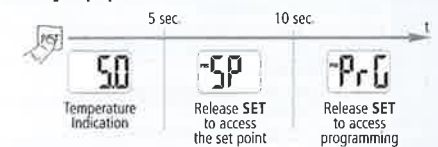
On power-up, the equipment will start up in Wizard mode (P3 / 1 flashing), press \blacktriangle or \blacktriangledown to select the most appropriate application and press SET.

- | | | |
|-----------------|----------------------|--------------------------|
| 1: Multipurpose | 2: Frozen | 3: Fruits and vegetables |
| 4: Fresh fish | 5: Soft Drinks | 6: Bottle racks |
| 7: AC | 8: Heat / Incubators | |

The wizard will configure the parameters of the equipment for the chosen application (see table "Default settings by application").

5.1- Access to set point and programming

3 key equipment



1 key equipment



Information on our web site: www.ako.com
We reserve the right to supply materials which may be slightly different from those described in our Data Sheets. Updated

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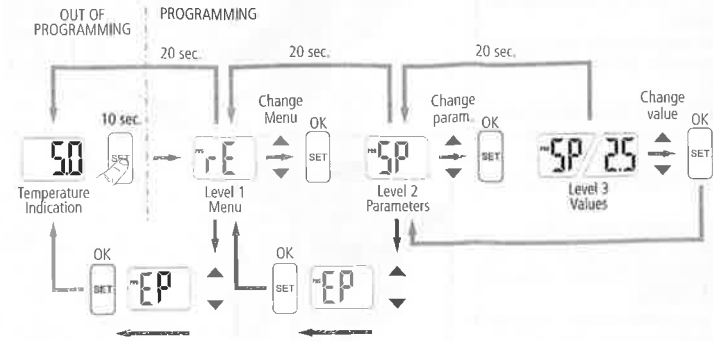


5.2- Setting parameters

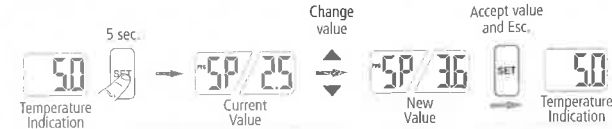
Programming Menu (parameters)

After 20 seconds with no key being pressed, the equipment will return to the previous level. If you are on level 3, the changes will not be saved

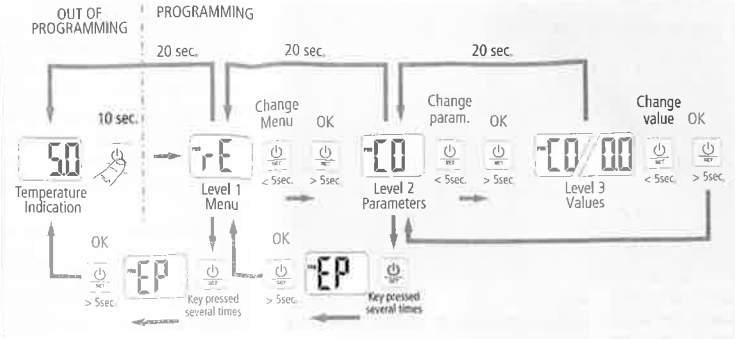
3 KEY EQUIPMENT



Change set point (only equipment with three keys)



1 KEY EQUIPMENT



6- Table of parameters and messages

Def. column shows factory-set default parameters. Those marked with * are variable parameters depending on the application chosen in the wizard or the P3 parameter (see table "Default parameters by application"). Unless otherwise stated, temperatures are expressed in °C. (Equivalent values in °F)

AKO-D14023-C					
AKO-D14012, AKO-D14023, AKO-D14024					
AKO-D14120, AKO-D14123, AKO-D14124, AKO-D14125					
Level 1 Menu and description					
rE Level 2 Control					
Level 3	Description	Values	Min.	Def. Max.	
SP	Temperature Adjustment (Set Point) (limits depending on probe type)	With NTC (°C/°F) With PTC	-50 (-58°F)	* 99 (210°F) 150 (302°F)	•
C0	Calibrating probe 1 (Offset)	(°C/°F)	-20.0	0.0 20.0	•
C1	Probe 1 differential (Hysteresis)	(°C/°F)	0.1	2.0 20.0	•
C2	Upper blocking of the set point (cannot be set above this value)	With NTC (°C/°F) With PTC	C3	99 (210°F) 150 (302°F)	•
C3	Lower blocking of the set point (cannot be set below this value)	(°C/°F)	-50 (-58°F)	-50 (-58°F)	C2 •
C4	Type of delay for protection of the compressor: 0=OFF/ON (since the last disconnection); 1=ON (since start-up/reset); 2=OFF/ON/ON-OFF (since the last shut-down/start-up)		0	0 2	•
C5	Protection delay time (value of the option selected in parameter C4)	(min.)	0	0 120	•
C6	Status of COOL relay with probe fault 0=OFF; 1=ON; 2=Average based on last 24 hours prior to probe fault; 3=ON-OFF as prog. C7 and C8 (in heat mode always OFF)		0	0 3	•
C7	Time relay ON in case of faulty probe (if C7=0 and C8=0, the relay will always be OFF deenergised)	(min.)	0	10 120	•
C8	Time relay OFF in case of fault of probe 1 (if C8=0 and C7≠0, the relay will always be ON energised)	(min.)	0	5 120	•
EP	Exit to Level 1				•
dEF Level 2 DEFROST Control (if P0=0 Direct, Cold)					
Level 3	Description	Values	Min.	Def. Max.	
d0	Defrost frequency (Time between two starts)	(h)	0	* 96	•
d1	Maximum defrost duration (0=defrost deactivated)	(min.)	0	* 255	•
d2	Type of message during defrost: 0=Current temperature; 1=Temperature at start of defrost; 2=Display dEF message		0	2 2	•
d3	Maximum duration of message (time added at the end of the defrost)	(min.)	0	5 255	•
d8	Calculated time between defrost periods: 0=Total actual time; 1=Sum of times the compressor is on		0	0 1	•
EP	Exit to Level 1				•
CnF Level 2 General status					
Level 3	Description	Values	Min.	Def. Max.	
P0	Type of operation 0=Direct, Cold; 1=Inverted, Heat		0	* 1	•
P1	Delay of all functions on receiving electrical power	(min.)	0	0 255	•
P2	Access code (password) functions 0=Inactive; 1=Block access to parameters; 2=Keyboard lock		0	0 2	•
P3	Set the default parameters according to the type of application (see accompanying table) 1=Multipurpose 2=Frozen 3=Fruit and Vegetables 4=Fresh Fish 5=Soft Drinks 6=Bottle Racks 7=AC 8=Heat/Incubators		1	8	•
P5	Address (only systems with built-in communications)		1	1 255	•
P7	Temperature display mode 0= Integer °C 1=One decimal in °C 2= Integer °F 3=One decimal in °F		0	1 3	•
P9	Selection of probe type 0=NTC; 1=PTC		0	0 1	•
EP	Exit to Level 1				•
tid Level 2 Access and information control					
Level 3	Description	Values	Min.	Def. Max.	
L5	Access code (Password)		0	- 99	•
PU	Program version (Information)				•
Pr	Program revision (Information)				•
EP	Exit to Level 1				•
EP	Exit Programming				•



WARNING: The default parameters by type of application have been defined for the most common applications. Check that these parameters are suitable for your installation.

DEFAULT SETTINGS BY APPLICATION (P3)								
	1 Multipurpose	2 Frozen	3 Fruit and Vegetables	4 Fresh Fish	5 Soft Drinks	6 Bottle Racks	7 AC	8 Heat/Incubators
SP	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	24	24	96	-
d1	20	20	20	20	20	20	0	-
P0	0	0	0	0	0	0	0	1

MESSAGES

Message	Description	D	S
L5	Access code (Password) request		
dEF	Indicates a defrost is underway (Only if parameter d2=2)	D	-
E1	Probe 1 faulty (open circuit, crossover; NTC: temp. >110°C or <-55°C PTC: temp. >150°C or <-58°C) - (equivalent limits in °F)	D	S

D: Displays the message on the display

S: Shows the message in the AKO-5004 software (Only AKO-D14023-C)

7- Technical specifications

Power supply AKO-D14023/D14024/D14123/D14124/D14125 . 230 V~ ±10 % 50/60 Hz 3.5 VA
AKO-D14120 120V~ +8 % -12 % 50/60 Hz 4 VA
AKO-D14023-C 90-260V ~ 50/60 Hz 6 VA
AKO-D14012 12/24V ≈ ±20% 2.5 VA

Maximum Voltage SELV circuits 20V
Communication (Only AKO-D14023-C) Modbus RTU RS485

Inputs (According to P4) 1 NTC/PTC
Relay COOL 16A (EN60730-1: 12(9)A 250V~)

Number of relay operations EN60730-1: 100.000 operations

Types of probe NTC AKO-149xx / PTC AKO-1558xx

Measurement range NTC -50,0 °C to +99,9 °C (-58,0 °F to 211 °F)

PTC -50,0 °C to +150 °C (-58,0 °F to 302 °F)

Resolution 0,1 °C

Working environment -10 to 50 °C, humidity <90 %

Ambient storage humidity -30 to 70 °C, humidity <90 %

Class of protection - front panel IP65

Fixation Panel-mounted with anchors

Panel cutout dimensions 71 x 29 mm

Front panel dimensions 79 x 38 mm

Depth 61 mm

Other models 43 mm

Connections Screw terminals for cables up to 2.5 mm²

Rating of control device: built-in, automatic operation feature Type 1.B, for use in clean environments, Class A software and continuous operation. Pollution classification 2 s/ UNE-EN 60730-1.

Double insulation between supply, secondary circuit and relay output.

Rated pulse voltage 2500V

Temperature during ball-pressure test Accessible parts 75 °C

Parts which position active elements 125 °C

Voltage and current as per EMC tests

AKO-D14023/D14023-C/D14024/
AKO-D14123/D14124/D14125/ 207 V, 17 mA

AKO-D14120 105 V, 36 mA

AKO-D14012 9,6 V, 181 mA

Current of radio jamming suppression tests 270 mA