

CE Temperature controllers



AKO-14412 / AKO-14423

Instructions

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AKO-14412 / AKO-14423

Electronic controllers for displaying and adjusting the temperature in cold (with manual and automatic programmable defrosting).

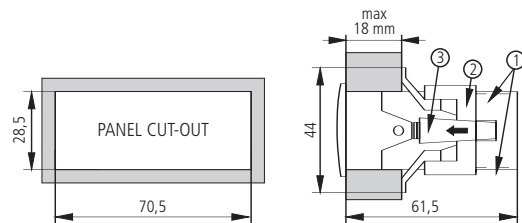
1.-Installation

The unit must be installed in a place protected from vibrations, water and corrosive gases, and where the ambient temperature does not surpass the values specified in the technical data.

In order for the panel mounting units to be suitable having IP65 protection, the gasket should be installed properly between the apparatus and the perimeter of the panel cut-out where it is to be fitted.

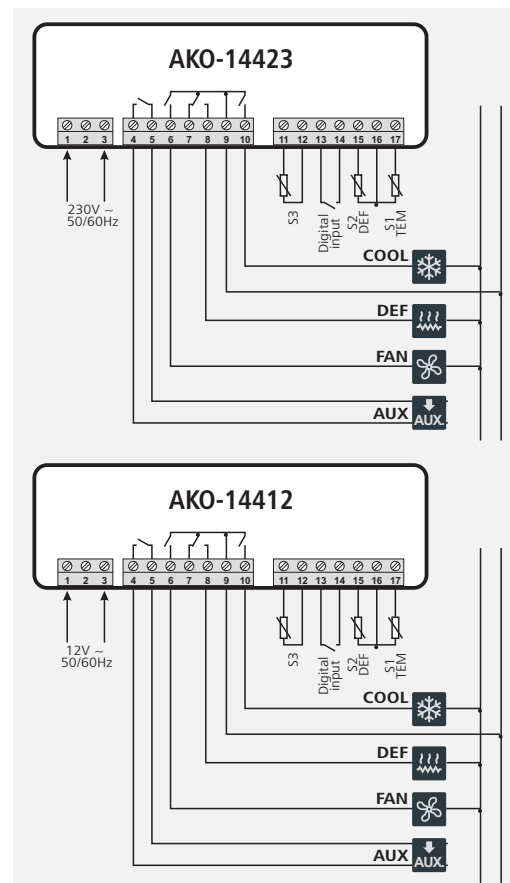
In order to give a correct reading, the probe has to be installed in a place without heat influences other than the temperature that is to be measured or controlled.

1.1-Fastening units for panel mounting



To fix the unit, place the fasteners 1 over the sliders 2 as shown in the figure. Move the fasteners in the direction of the arrow. By pressing tab 3 the fasteners may be moved in the opposite direction of the arrow.

2.-Connection

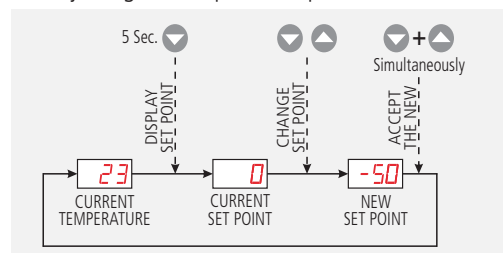


i The probe and its lead should **NEVER** be installed in ducting along with mains, control or power supply wiring. The power supply circuit should be connected with a minimum 2A, 230V, switch located close to the unit. The cables enter at the rear and should be of the type H05VV-F 2x0,5 mm² or H05V-K 1x0,5 mm². Section of connecting wires for relays contacts must be between 1 mm² y 2,5 mm².

3.-Adjustment and configuration

It should only be programmed or modified by personnel who are fully conversant with the equipment operation and possibilities.

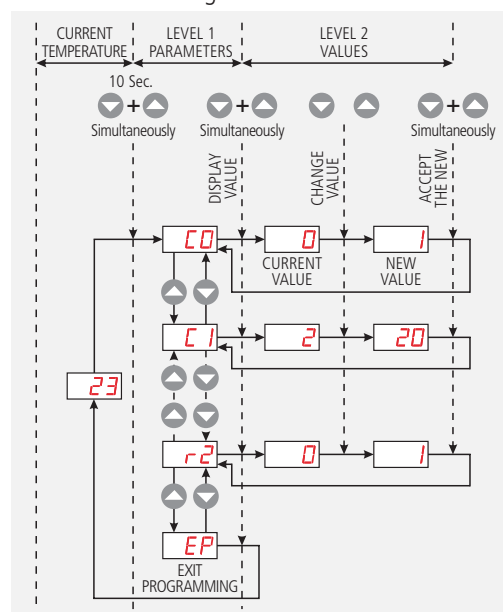
3.1-Adjusting the set point temperature



The factory SET POINT default value is 0 °C.

- Press **DOWN** key for at least 5 seconds to DISPLAY SET POINT. It displays the CURRENT SET POINT value and LED "PR" starts flashing.
- Press **UP** or **DOWN** keys to CHANGE SET POINT into the required value.
- Press **UP** + **DOWN** keys simultaneously to ACCEPT THE NEW SET POINT. The display returns to the current temperature display status and LED "PR" stops flashing.

3.2-Parameters configuration



LEVEL 1 PARAMETERS:

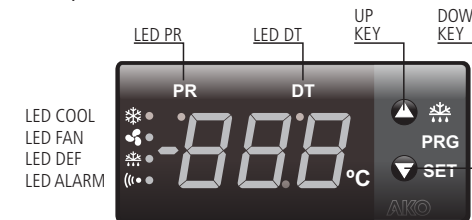
- Press **UP** + **DOWN** keys simultaneously for at least 10 seconds. LED "PR" will be flashing, indicating that we are in the programming LEVEL 1 PARAMETERS and the first parameter "CO" is displayed.
- Press **UP** key to access the next parameter and **DOWN** key to return to the previous one.
- Pressing **UP** + **DOWN** keys simultaneously in the last parameter EP, the controller returns to the current temperature display status and LED "PR" will stop flashing.

LEVEL 2 VALUES:

- To DISPLAY CURRENT VALUE of any parameter, select the required one and press **UP** + **DOWN** keys simultaneously. Once it is displayed, pressing **UP** or **DOWN** key can CHANGE VALUE.
- Press **UP** + **DOWN** keys simultaneously to ACCEPT THE NEW VALUE. The programming returns to LEVEL 1 PARAMETERS.

i **NOTE:** If a key is not pressed for 25 seconds in any of the previous steps, then the equipment will automatically return to the current temperature display situation without modifying any of the values.

4.-Operation



UP key **UP**

- When pressed for at least 5 seconds, a manual defrost is started with programmed duration.
- In programming, it increases the value being displayed.
- Cancels the alarms, but they remain displayed.

DOWN key **DOWN**

- When pressed for at least 5 seconds, it displays the SET POINT temperature value.
- In programming, it decreases the value being displayed.
- Cancels the alarms, but they remain displayed.

LED DT

permanent: Indicates last defrost ended by time.

LED PR

Flashing: Set Point or parameter programming phase.

LED COOL

permanent: Cooling relay COOL (compressor) energized.

Flashing: Because of the temperature detected by Sensor 1 (TEM), the COOL relay should be energized, but is not due to a programmed parameter.

LED FAN

permanent: FAN relay energized

Flashing: Because of the temperature detected by Sensor 2 (DEF), the FAN relay should be energized, but is not due to a programmed parameter.

LED DEF

permanent: Indicates defrost in operation.

LED ALARM

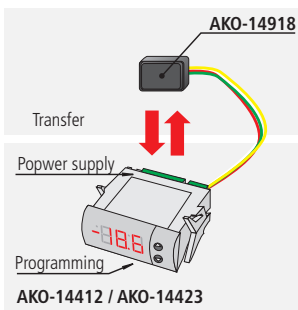
permanent: Indicates defrost in operation.

Flashing: Alarm detected, relay de-energized, but display maintained.

5.-Accessories

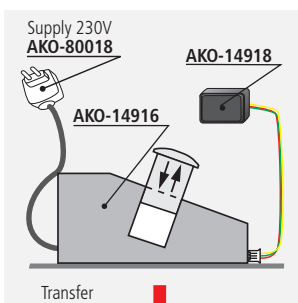
PORTABLE SERVER

AKO-14918 portable server, with no power supply, in which parameters programmed in a powered controller can be copied by transfer. Parameters can be transferred again from the server to other identical powered controllers.



DESKTOP SERVERS

Desktop servers to be connected by **AKO-80018** 230/12 V, power supplier. Parameters previously recorded in an **AKO-14918** portable server can be transferred from these servers to a large amount of controllers that should be identically programmed, by the connector for parameter transfer, with no need of power supply.



COMMUNICATIONS

The units provided with a communications connector, permit data transmission and reception using the standard **MODBUS** protocol and to carry out management from PC software (requires **AKO-14917**). This makes a centralised system for display, logging, alarms, remote teleprocessing ...



AKO-5004

Software for controllers and data loggers using a PC type computer.

7.-Maintenance and Warnings

Clean the surface of the units with a soft cloth and soap and water. Do not use abrasive detergents, petrol, alcohol or solvents.

The use of the unit without observing the manufacturer's instructions may alter its safety qualification.

To ensure correct operation of the apparatus, only NTC type probes supplied by AKO should be used.

Between -40 °C and +20 °C, when probes is extended with minimum 0,5 mm² up to 1000m cable, deviation will be less than 0,25 °C (Sensor prolongation cable ref. **AKO-15586**).

The diagrams in this instructions represent concepts, the rating plate of each unit includes its diagram with terminal numbering for correct connection.

6.-Programmable parameters

Menus and Description					
Level 1 REFRIGERATION control (Compressor)					
Level 2	Description	Values	Min.	Def.	Máx.
C0	Sensor 1 calibration (Offset)	(°C/°F)	-20	0	20
C1	Sensor 1 differential (Hysteresis)	(°C/°F)	1	2	20
C2	Set point upper limit (It cannot be set above this value)	(°C/°F)	C3	99	99
C3	Set point lower limit (It cannot be set below this value)	(°C/°F)	-50	-50	C2
Compressor protection delay type: 0=OFF/ON (From de last to switch-off) 1=ON (At swicht-on)					
C5	Protection delay time (Value for the option selected for parameter C4)	(min.)	0	0	99
C6	"COOL" relay status with faulty sensor 1 0=OFF 1=ON 2=OFF/ON (To C7 and C8 program)		0	1	2
C7	"COOL" relay (Compressor) ON time in case of sensor 1 failure if C7=0 and C8≠0, the relay will always be OFF de-energised	(min.)	0	10	99
C8	"COOL" relay (Compressor) OFF time in case of sensor 1 failure if C8=0 and C7≠0, the relay will always be ON energised	(min.)	0	5	99
C9	Continuous cycle duration	(h.)	1	1	24
Level 1 DEFROST control					
Level 2	Description	Values	Min.	Def.	Máx.
d0	Elapsed time between 2 starts	(h.)	0	6	99
d1	Maximum duration	(°C/°F)	0	30	99
d2	Type of message during defrost: (0=Display the actual temp.) (1=Display the defrost start temp.) (2=Display the message dF or dEF)		0	2	2
d3	Message maximum duration (Time added at the end of defrost)	(min.)	0	5	99
d4	Defrost final temperature by sensor 2 (If it is programmed in P4)	(°C/°F)	-50	8	99
Defrost on equipment switch on: (0=No, first defrost according d0) (1=Yes, first defrost according d6)					
d6	Defrost start delay on equipment switch-off if d5=1	(min.)	0	0	99
d7	Defrost type: (0=Electric heat) (1=Hot gas by-pass) To defrost by air in 2.relays, parameters P6 and F3 should be programmed		0	0	1
d8	Time calculation between defrost periods: (0=Total real time) (1=Compressor operation sum)		0	0	1
d9	Drip time, compressor stop and FAN/R2 relay off when defrost ends In 2-relay, R2 operates in all cases of P6	(min.)	0	1	99
d10	Defrost 1 start-up time		0	Off	23
d11	Defrost 2 start-up time		0	Off	23
d12	Defrost 3 start-up time		0	Off	23
d13	Defrost 4 start-up time		0	Off	23
d14	Defrost 5 start-up time		0	Off	23
d15	Defrost 6 start-up time		0	Off	23
Level 1 FANS control (Evaporator)					
Level 2	Description	Values	Min.	Def.	Máx.
F0	Sensor 2 fan stop temperatures (If it is programmed in P4)	(°C/°F)	-50	4	99
F1	Sensor 2 (F0) differential for switching the FAN/R2 relay A1 and A2 Differential In 2-relay models if P6=1 and P4=2/3	(°C/°F)	1	2	50
F2	Stop fans if compressor stops? (0=No) (1=Yes)		0	0	1
F3	Fan status during defrost (0=Stopped) (1=Running)		0	0	1
F4	Start-up delay after defrost (Applicable if greater than d9)	(min.)	0	3	99
F5	Stop fans if the door opens?: (0=No) (1=Yes) (Door if P9=1)		0	0	1

NOTE: When the time parameters are modified, the new values are applied once the current cycle is completed. In order for it to have an immediate effect, switch the controller off and then on again.

8.-Technical data

3 Digit decimal pt. from -49,9°C to 99,9°C
Sensor 1, NTC 1,5m included, adjustable
Sensor 2, NTC not included
Sensor 3, NTC not included
Power supply 12v AC/DC ±20%, 50/60Hz
Power supply 230v~ ±10%, 50/60Hz
Relay 1, Control (compressor) R 16(4)A, 250V, cos φ=1, SPDT
Relay 2, Defrost R 8A, 250V, cos φ=1, SPDT switch
Relay 3, Fan R 6A, 250V, cos φ=1, SPST
Relay 4, Alarm R 6A, 250V, cos φ=1, SPST

Digital input (for voltage-free contacts)
Real time clock
Connector for parameter transfer and communication
Thermometric accuracy ±1 °C
Probe tolerance at 25 °C. ±0,4 °C
Maximum input power 4,5VA
Working ambient temperature 5°C to 50°C
Storage ambient temperature -30°C to 70°C
Double insulation between power supply, secondary circuit and relay output.
Installation category II under CEI 664 standard.

WARNING: The current specified for each relay is its individual maximum, if more than one is connected, the sum current (COOL + DEF + FAN + ALARM) should not exceed 17A.

Level 1 ALARMS control (Visual or relay)					
Level 2	Description	Values	Min.	Def.	Máx.
A1	Maximum, °C above the Set Point in sensor 1	(°C/°F)	0=Off	0=Off	99
A2	Minimum, °C below the Set Point in sensor 1	(°C/°F)	0=Off	0=Off	99
A3	Start-up temperature alarm delay (If programmed in A1, A2)	(min.)	0=Off	0=Off	120
A4	Temp. alarm delay from end of defrost	(min.)	0=Off	0=Off	99
A5	Temp. alarm delay from at which they should operate due to temperature	(min.)	0=Off	30	99
A6	Temp. alarm delay from digital input disable (Door if P9=1)	(min.)	0=Off	0=Off	126
A7	Temp. alarm delay from digital input enable (Door if P9=1)	(min.)	0=Off	0=Off	126
A8	Alarms if defrost ends for maximum time: (0=No) (1=Yes)		0	0	1
A9	Relay 4 alarm polarity configuration: (0=With alarm relay ON) (1=With alarm relay OFF)		0	0	1
Level 1 GENERAL STATUS					
Level 2	Description	Values	Min.	Def.	Máx.
P1	Delay for all function on power supply switch on	(min.)	0	0	99
P2	Programmed parameter block: (1=Yes, block) (0=No, unblock)		0	0	1
P3	Initial parameters: (1=Yes, configure to "Def" and exit progr.)		0	0	1
P4	Connected sensors: (1=Sensor 1) (2=Sensor 1+Sensor 2) (3=Sensor 1 +Sensor 2 +Sensor 3)		1	2	3
P5	Address for units with communication		0	0	126
P7	Temperature display mode: (0=Integers in °C) (1=One decimal in °C)		0	0	1
P8	Displayed sensor: (1=Sensor 1) (2=Sensor 2) (3=Sensor 3)		1	1	3
P9	Digital input configuration: (0:Disabled, 1:Door contact, 2:External alarm, 3:Severe external alarm, 4:Remote defrost, 5:Set point Change, 6: Remote Continuous cycle)		0	0	6
P10	Contact with open door or enabled alarm: (0=Open) (1=Closed)		0	0	1
P11	Transfer parameters: (0=Disabled) (1=Send) (2=Receive)		0	0	2
P12	Program version (Information)				
P13	Value of auxiliary set point of "COOL" Relay (Compressor)	(°C/°F)	-50	0	99
P14	Duration of auxiliary set point	(min.)	0	0	126
P15	Auxiliary relay function (0: Alarm) (1: Second defrost) (If P4=3, P15=1)		0	0	1
Level 1 REAL TIME CLOCK					
Level 2	Description	Values	Min.	Def.	Máx.
r1	Clock configuration, Hour		0	x	23
r2	Clock configuration, Minute		0	x	59
EP	Exit programming				
MESSAGES					
dEF	Indicates defrost is being carried out. (it is essential that parameter d2 is set to option 2)				
AE	Flashing with temperature- External alarm (if P9=2)				
AES	Flashing with temperature- Severe external alarm				
AH	Flashing with temperature- The sensor 1 temperature exceeds that programmed in A1				
AL	Flashing with temperature- The sensor 1 temperature is lower than that programmed in A2				
Ar	Flashing with temperature- Low-charge dock battery or non-programmed dock alarm				
CC	Continuous cycle				
E1	Sensor 1 failure (Open circuit, crossed, temp.> 110°C ó temp.<-55°C)				
E2	Sensor 2 failure (Open circuit, crossed, temp.> 110°C ó temp.<-55°C)				
E3	Sensor 3 failure (Open circuit, crossed, temp.> 110°C ó temp.<-55°C)				
E5	Incorrect sensor configuration (See P4, P8)				
EE	Memory failure				

WARNING: Messages E2 and E3 are displayed if P4 has been suitable programmed. Equipment operation under these conditions is the same as if P4 had been programmed with option 1