CE Surface temperature controller with 3 relays and 2 probes

Device designed to display, control and regulate cooling generators (manual or automatic programmable defrosting).

1- Versions and references

MODEL	FUNCTION	RELAY	POWER SUPPLY, 50/60 Hz
AKO-14632	Controller	COOL: 16 A, 250 V, cos φ=1, SPST DEF: 8 A, 250 V, cos φ=1, SPDT FAN: 6 A, 250 V, cos φ=1, SPST	230 V~ ±10%

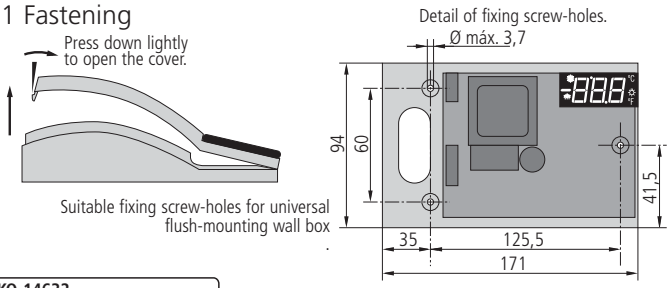
2- Technical data

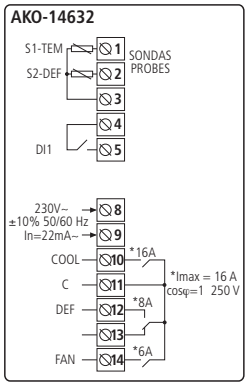
Temperature range:. . . . . -50.0 °C to 99.9 °C (-58.0 °F to 211 °F)
Resolution, Set Point and differential: . . . . . 0,1 or 1 °C/°F configurable by parameter P7
Input for NTC probe: **AKO-149XX**
Thermometric accuracy:. . . . . ± 1 °C
Probe tolerance at 25 °C: . . . . . ± 0,4 °C
Maximum input power: . . . . . 7 VA
Working ambient temperature:. . . . . 5 °C to 50 °C
Storage ambient temperature:. . . . . -30 °C to 70 °C
Control device classification:
Independent mounting, with characteristic of automatic operation Type 1.B action, to be used in a clean situation, logical medium (software) class A and continuous operation.
Degree of contamination 2 on UNE-EN 60730-1
Double insulation between the power supply, the secondary circuit and the relay output.
Allocated pulse temperature: . . . . . 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, 22 mA
Current of radio jamming supression test:. . . . . 270 mA

3- Installation

The controller should be installed in a place protected from vibrations, water and corrosive gases, and where ambient temperature does not surpass the value specified in the technical data.
In order to give a correct reading, the probe should be installed in a place without heat influences other than the temperature that is to be measured or controlled.

3.1 Fastening





3.2 Connection:

The probe and its lead should **NEVER** be installed in ducting along with power, control or power supply wiring.

The power supply circuit should be connected with a minimum 2 A, 230 V, switch located close to the unit. Power supply cables should be H05VV-F 2x0,5 mm² or H05V-K 2x0,5 mm² .

Section of connecting wires for relays contacts should be 2,5 mm².

4- Funciones del frontal

LED Cool (Compressor)
Permanent: Cooling relay COOL (compressor) energised.
Flashing: Because of the temperature detected by Sensor 1 (TEM), the COOL relay should be energised, but is no due to a programmed parameter.

LED Fan
Permanent: Fan relay energised.
Flashing: Because of the temperature detected by Sensor 2 (DEF), the Fan relay should be energised, but is no due to a programmed parameter.

LED Def
Permanent: Indicates defrost in operation.

LED Alarm
Permanent: Alarm indicator enabled.
Flashing: Alarm detected, but display maintained.

LED DT
Permanent: Indicates last defrost ended by time.

LED Continuous cycle
Permanent: It indicates that the continuous cycle is active.

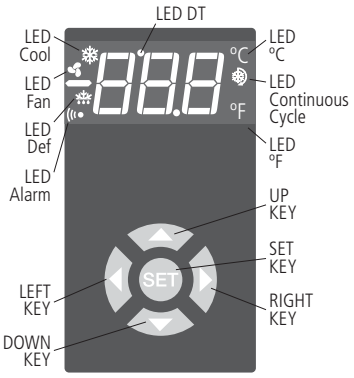
LED °C
Permanent: Degrees °C indicator.
Flashing: Programming phase.

LED °F
Permanent: Degrees °F indicator.
Flashing: Programming phase.

UP KEY
- Press once to cancel the alarms, but they remain displayed.
- In programming, it makes the displayed value increase.
- When pressed it displays the help message **dEF** corresponding to the short key function that it performs.
- When pressed for at least 5 seconds, a manual **defrost** is started / stopped with programmed duration.

DOWN KEY
- Press once to cancel the alarms, but they remain displayed.
- In programming, it makes the displayed value reduce.
- When pressed, it displays the help message **Con** corresponding to the function performed by the key.
- Pressing during 3 seconds,it activates / deactivates the **CONTINUOUS CYCLE** during the time for which it has been programmed.

RIGHT KEY
- Press once to cancel the alarms, but they remain displayed.
- In programming, it makes the level value increase.
- When pressed, it displays the help message **oFF** corresponding to the function performed by the key.



- Pressing during 3 seconds it turns off/on the unit leaving it in **STAND-BY**. The display shows **oFF** when the unit is disconnected.

LEFT KEY
- Press once to cancel the alarms, but they remain displayed.
- Exit programming level.

SET KEY
- Press once to cancel the alarms, but they remain displayed.
- In programming, accept the programmed new value.
- When pressed it displays the help message **SP** corresponding to the function performed by the key.
- When pressed for at least 5 seconds, the SP **Set Point** temperature is displayed.

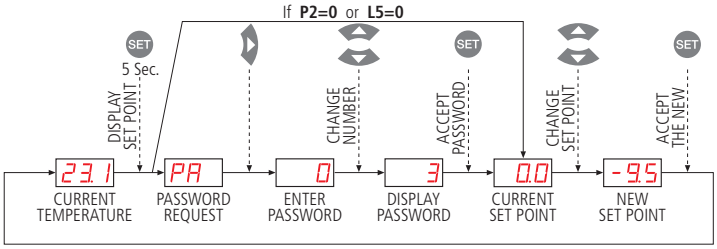
5- Adjustment and configuration

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

5.1 Set Point temperature

The factory SET POINT default value is 0.0 °C.
- Press **SET** key for at least 5 seconds to DISPLAY SET POINT. It displays the CURRENT SET POINT value and LED °C or °F starts flashing.
- Press ▲ or ▼ keys to CHANGE SET POINT into the required value.
- Press **SET** key to ACCEPT THE NEW SET POINT. The display returns to the CURRENT TEMPERATURE display status and LED °C or °F stops flashing.
- Press the ◀ key to exit the temperature set point without modifying the value.

When **PA** is displayed, PASSWORD programmed in **L5** parameter of **tid** menu should be entered to access the CURRENT SET POINT.
- Press ▶ key. **0** will be displayed to ENTER PASSWORD.
- Press ▲ or ▼ keys to CHANGE NUMBER and DISPLAY PASSWORD programmed.
- Press **SET** key to ACCEPT PASSWORD. The CURRENT SET POINT value will be displayed and it can be already modified.

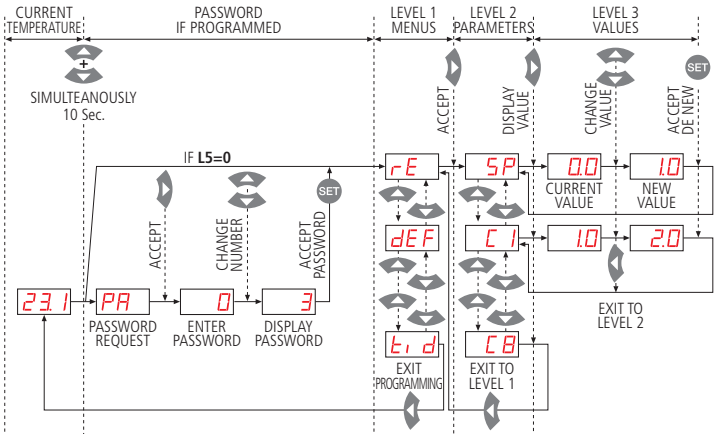


5.2 Parameters configuration

Level 1 Menus

When the keys ▲ + ▼ are pressed simultaneously for at least 10 seconds, the display shows **Pro** for 10 seconds. LED °C or °F will be flashing, we are in the programming LEVEL 1 MENUS and the first menu "**rE**" is displayed.
- Press ▲ key to access the next menu and ▼ key to return to previous one.
- Pressing ◀ key, the controller returns to the CURRENT TEMPERATURE display status and LED °C or °F will stop flashing.

When **PA** is displayed, PASSWORD programmed in **L5** of "**tid**" menu should be entered to access programming LEVEL 1 MENUS.
- Press ▶ key. **0** will be displayed to ENTER PASSWORD.
- Press ▲ or ▼ keys to CHANGE NUMBER and DISPLAY PASSWORD programmed.
- Press **SET** key to ACCEPT PASSWORD. The first menu "**rE**" will be displayed.



Level 2 Parameters

- In the desired menu of LEVEL 1 MENUS, press ▶ key. LEVEL 2 PARAMETERS programming is accessed. The first parameter of the selected menu is displayed on the screen.
- Press ▲ key to access the next parameter and ▼ key to return to the previous one.
- Pressing ◀ key, the controller returns to the LEVEL 1 MENUS

Level 3 Values

- To DISPLAY the CURRENT VALUE of any parameter, select the required one and press ▶ key. Once it is displayed, you can CHANGE VALUE, pressing ▲ or ▼ key.
- Press **SET** key to ACCEPT THE NEW. The programming returns to LEVEL 2 PARAMETERS.
- Pressing ◀ key, the controller returns to the LEVEL 2 PARAMETERS

REMARK: If no key is pressed for 25 seconds in either of the previous steps, the controller will automatically return to the CURRENT TEMPERATURE display status without modifying any of the parameters values.

6- Description of parameters and messages

Values in the **Def.** column are factory-set.

Level 1	Menus and Description					
rE	Level 2	Control				
		Level 3 Description	Values	Min.	Def.	Max.
	SP	Set Point temperature	(°C/°F)	-58.0	0.0	211
	C0	Sensor 1 calibration (Offset)	(°C/°F)	-20.0	0.0	20.0
	C1	Sensor 1 differential (Hysteresis)	(°C/°F)	0.1	2.0	20.0
	C2	Set Point upper limit (It cannot be set above this value)	(°C/°F)	C3	99.9	211
	C3	Set Point lower limit (It cannot be set below this value)	(°C/°F)	-58.0	-50.0	C2
	C4	Relay protection delay type: 0=OFF/ON (From the last switch-off) 1=ON (At switch-on)		0	0	1
	C5	Protection delay time (Value for the option selected in parameter C4)	(min.)	0	0	255
	C7	Relay time in ON in case of faulty sensor (If C7=0 and C8≠0, the relay will always be OFF disconnected)	(min.)	0	10	255
	C8	Relay time in OFF in case of faulty sensor (If C8=0 and C7≠0, the relay will always be ON connected)	(min.)	0	5	255
	C9	Continuous cycle duration	(h.)	1	1	24
	C10	Compressor stops when opening door? (0 = No) (1 = Yes)		0	0	1
dEF	Level 2	DEFROST control				
		Level 3 Description	Values	Min.	Def.	Max.
	d0	Defrost frequency (Elapsed time between 2 starts)	(h.)	0	6	120
	d1	Defrost maximum duration	(min.)	0	30	255
	d2	Type of message during defrost: (0=Current temperature display) (1=Defrost start temperature display) (2=Display dEF message)		0	2	2
	d3	Message maximum duration (Time added at the end of defrost)	(min.)	0	5	255
	d4	Defrost final temperature by sensor 2	(°C/°F)	-58.0	8.0	211
	d5	Defrost start-up on equipment switch-on: (0 = No, first defrost according to d0) (1 = Yes, first defrost according to d6)		0	0	1
	d6	Defrost start-up delay on equipment switch-on	(min.)	0	0	255
	d7	Defrost type: (0=Electrical heater) (1=Hot gas by-pass)		0	0	1
	d8	Time calculation between defrost periods: (0 = Total real time) (1 = Compressor operation sum)		0	0	1
	d9	Drip time, compressor stops and FAN relay off when defrost ends	(min.)	0	1	255
FAn	Level 2	FANS control (Evaporator)				
		Level 3 Description	Values	Min.	Def.	Max.
	F0	Fans stop temperature by sensor 2 If sensor 2 is programmed in P4	(°C/°F)	-58.0	4.0	211
	F1	Sensor 2 differential	(°C/°F)	0.1	1.0	20.0
	F2	Stop fans, when compressor stops? (0=No) (1=Yes)		0	0	1
	F3	Fans status during defrost (0 = Off) (1 = On)		0	0	1
	F4	Start-up delay after defrost Operates if it is higher than d9	(min.)	0	3	255
	F5	Stop fans if the door opens? (0 = No) (1 = Yes)		0	0	1
AL	Level 2	ALARM control (Visual)				
		Level 3 Description	Values	Min.	Def.	Max.
	A0	Configuration of temperature alarms (0=Relative to SP) (1=Absolute) (If A0=0, A1 and A2 range from 0 to 50 °C/°F)		0	0	1
	A1	Maximum alarm in sensor 1	(°C/°F)	A2	0.0	211
	A2	Minimum alarm in sensor 1	(°C/°F)	-58.0	0.0	A1
	A3	Temperature alarm delay in the start-up (If programmed in A1, A2)	(min.)	0	0	255
	A4	Temperature alarm delay from the end of a defrost	(min.)	0	0	255
	A5	Temperature alarm delay from the moment at which they should operate due to temperature	(min.)	0	30	255
	A6	Temperature alarm delay from digital input disabling If programmed as "Door contact"	(min.)	0	0	255
	A7	Temperature alarm delay from digital input enabling If programmed as "Door contact"	(min.)	0	0	255
	A8	Signals if defrost ends due to maximum time (0=No) (1=Yes)		0	0	1
	A10	Differential Alarms Temperature A1 and A2		0.1	1.0	20.0
InP	Level 2	DIGITAL INPUTS				
		Level 3 Description	Values	Min.	Def.	Max.
	i1C	Digital Input N°1 configuration (0=Disabled) (1=Door Contact) (2=External alarm) (3=Severe external alarm) (4=Remote defrost) (5=Change of set point iS1 + it1)		0	0	5
	i1d	Alarm delay of digital Input N° 1	(min.)	0	0	255
	i1P	Polarity of digital input N°1 (0=Activated on closing contact) (1=Activated on opening contact)		0	0	1
	iS1	Value of auxiliary set point 1 of "COOL" Relay (Compressor)	(°C/°F)	-58.0	0.0	211
	it1	Duration of auxiliary set point 1	(min.)	0	0	255
CnF	Level 2	GENERAL STATUS				
		Level 3 Description	Values	Min.	Def.	Max.
	P1	Delay of all functions on power supply switch on	(min.)	0	0	255
	P2	Allocation of password to Set Point: (0=Without allocation) (1=With allocation of L5 password)		0	0	1
	P3	Initial parameters: (1=YES, configure to "Def" and exit programming)		0	0	1
	P4	Connected sensors (1 = Sensor 1) (2 = Sensor 1 + Sensor 2)		1	2	2
	P5	Address for units with communication		0	0	255
	P7	Temperature display mode: (0=Integers in °C) (1=One decimal in °C) (2=Integers in °F) (3=One decimal in °F)		0	1	3
	P8	Sensor to be displayed (1=Sensor 1) (2=Sensor 2)		1	1	2
tid	Level 2	ACCESS AND INFORMATION control				
		Level 3 Description	Values	Min.	Def.	Max.
	L5	Access password to parameters and information		0	0	255
	L6	Parameters transfer: (0=Disabled) (1=Send) (2=Receive)		0	0	2
	PU	Program version (Information)				

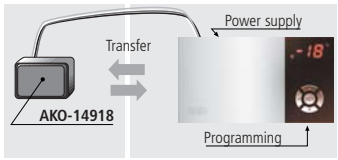
REMARK: When time parameters are modified, the new values are applied when the current cycle is completed. In order for it to have an immediate effect, switch the controller off and then on again.

MESSAGES	
PA	Password request to enter programming parameters or SET POINT
dEF	It indicates defrosting is being carried out. In order to display "dEF" during defrosting, it is essential that parameter d2 is set to option 2.
AE	**Flashing with temperature** - External alarm
AES	**Flashing with temperature** - Severe external alarm
AH	**Flashing with temperature** -Maximum temperature alarm. Sensor 1 temperature exceeds the parameter programmed in A1.
AL	**Flashing with temperature** - Minimum temperature alarm. Sensor 1 temperature is lower than the parameter programmed in A2.
oFF	**Unit off** - STANDBY Mode (equipment maintains electric power supply)
CPY	Parameters received from the parameters server.
E1	Sensor 1 failure (Open circuit, crossed, temp.> 110°C or temp.<-55°C
E2	Sensor 2 failure (Open circuit, crossed, temp.> 110°C or temp.<-55°C
ES	Incorrect sensor configuration (See P4, P8)
EE	Memory failure

7- Parameters transfer

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.



Storage dump or fast copy of the parameters entered in the portable server to the controller:

Press the key ▶ while the controller is being connected to the power supply until the display shows **CPY**, indicating that the transfer was made correctly. Disconnect the controller and reconnect it to the power supply.

Storage dump can also be done from parameter L6=2.

8- Maintenance

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

9- Warnings

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 the NTC probe is extended up to 1.000 m with minimum 0,5 mm² cable, deviation will be less than 0.25 °C (Probe extension cable ref. **AKO-15586**)

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