Temperature controller up to three relays and two probes

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

1- Versions and references

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RELAYS</th>
<th>POWER SUPPLY, 50/60 Hz</th>
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</thead>
<tbody>
<tr>
<td>AKO-14212</td>
<td>Cool: 16 A, 250 V, cos φ=1, SPST</td>
<td>12 V = ±20%</td>
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<tr>
<td></td>
<td>R2: 8 A, 250 V, cos φ=1, SPDT</td>
<td></td>
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<tr>
<td>AKO-14220</td>
<td>Cool: 16 A, 250 V, cos φ=1, SPST</td>
<td>120 V = ±8% to ±12%</td>
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<tr>
<td></td>
<td>R2: 8 A, 250 V, cos φ=1, SPDT</td>
<td></td>
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<tr>
<td>AKO-14223</td>
<td>Cool: 16 A, 250 V, cos φ=1, SPST</td>
<td>230 V = ±10%</td>
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<tr>
<td></td>
<td>Def: 8 A, 250 V, cos φ=1, SPDT</td>
<td></td>
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<tr>
<td></td>
<td>Fan: 6 A, 250 V, cos φ=1, SPST</td>
<td>12 V = ±20%</td>
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<td></td>
<td>R2: 8 A, 250 V, cos φ=1, SPDT</td>
<td></td>
</tr>
<tr>
<td>AKO-14323</td>
<td>Cool: 16 A, 250 V, cos φ=1, SPST</td>
<td>120 V = ±8% to ±12%</td>
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<tr>
<td></td>
<td>Def: 8 A, 250 V, cos φ=1, SPDT</td>
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<tr>
<td></td>
<td>Fan: 6 A, 250 V, cos φ=1, SPST</td>
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</tr>
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</tbody>
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2- Technical data

Temperature range: -50,0ºC to +99,9ºC
Resolution, Set Point and differential: 0,1ºC
Input for NTC probe: AKO-149XX
Thermometric accuracy: ± 1ºC
Probe tolerance at 25 ºC: 0,4ºC
Maximum input power: 3 VA
Working ambient temperature: -5 ºC to 40 ºC
Storage ambient temperature: -30 ºC to 70 ºC
Control device classification: Integrated mounting, with characteristic of automatic operation Type 1B 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: 70,5ºC

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 for the controllers to have IP65 protection, the gasket should be properly installed 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 should be installed in a place without heat influences other than the temperature that is to be measured or controlled.

3.1 Fastening units for panel mounting:

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 H05VV-F 2x0,5 mm². Section of connecting wires for relay contacts should be 2,5 mm².

4- Front panel functions

LED COOL ⬤
Permanent: Cooling relay COOL (compressor) energised.
Flashing: Because of the temperature detected by Sensor 1 (TEM), the COOL relay should be energised, but is not 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 not due to a programmed parameter.

LED Def ⬤
Permanent: Indicates defrost in operation.
Flashing: Alarm indicator energised, display maintained.

LED COOL ⬤
Permanent: Indicates defrost in operation.
Flashing: Alarm detected, display maintained.

LED °C
Permanent: Degrees ºC indicator.

5- Adjustment and configuration

5.1 Set Point temperature

The factory SET POINT default value is 0.0 ºC.
- Press [PÆ] key for at least 5 seconds to DISPLAY SET POINT. It displays the CURRENT SET POINT value and LED °C or ºF starts flashing.
- Press [PÆ] key to CHANGE SET POINT into the required value.
- Pressing [PÆ] + [PÆ] keys simultaneously to ACCEPT the NEW SET POINT. The display returns to the CURRENT TEMPERATURE display status and LED °C or ºF stops flashing.

5.2 Parameters configuration

Level 1 Menus
- Press simultaneously [PÆ] + [PÆ] keys for at least 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 [PÆ] key to access the next menu and [PÆ] key to return to previous one.
- Pressing [PÆ] + [PÆ] keys in the last menu EP, the controller returns to the CURRENT TEMPERATURE display status and LED °C or °F will stop flashing.

Level 2 Parameters
- In the desired menu of LEVEL 1 MENUS, press [PÆ] + [PÆ] keys simultaneously. LEVEL 2 PARAMETERS programming is accessed. The first parameter of the selected menu is displayed on the screen.
- Press [PÆ] key to access the next parameter and [PÆ] key to return to the previous one.
- Pressing [PÆ] + [PÆ] keys simultaneously in the last parameter EP, 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 + or - keys simultaneously. Once it is displayed, you can CHANGE VALUE, pressing + or - keys simultaneously.
- Press + or - keys simultaneously to ACCEPT THE NEW. The programming returns to LEVEL 2 PARAMETERS.

6- Description of parameters and messages
Values in the Def. column are factory-set.

Level 1 Memorized Description
Level 2 REFRIGERATION control (Compressor)

**C0**
Sensor 1 calibration (Offset) *(ºC/ºF)* 20.0 0.0 20.0

**C1**
Sensor 1 hysteresis *(ºC/ºF)* 0.1 2.0

**C2**
Set Point upper limit *(ºC/ºF)* C3 99.9 99.9

**C3**
Set Point lower limit *(ºC/ºF)* 50.0-50.0

**C4**
Compressor protection delay type: 0=OFF (From the last switch-off), 1=ON (At switch-on) 0 0 1

**C5**
Protection delay time (min.) 00 99

**C6**
Sensor1 calibration (Offset) *(ºC/ºF)* -20.0 0.0 20.0

**C7**
Set Point upper limit *(ºC/ºF)* C3 99.9 99.9

**C8**
Set Point lower limit *(ºC/ºF)* 50.0-50.0

**C9**
Protection delay time (min.) 0 0 99

**C10**
Compressor relay time in OFF (for the option selected in parameter C4) *(min.)* 0 10 99

**C11**
COOL (Compressor) relay time in OFF (in case of faulty sensor 1) *(min.)* 0 5 99

**EP**
Exit to Level 1

**DEF**
Exit to Level 2

**DEFR**
DEFR0ST control

**d0**
Defrost frequency (Elapsed time between start times) *(h.)* 0 8 99

**d1**
Defrost maximum duration *(min.)* 0 30 99

**d2**
Defrost start-up on equipment switch-on: 0=Current temperature display, 1=Defrost start temperature display *(ºC/ºF)* 0 2 2

**d3**
Delay of all functions on power supply switchon (min.) 00 99

**d4**
Defrost final temperature by sensor 2 *(ºC/ºF)* 50.0 8.0 99.9

**d5**
Defrost start-up delay on equipment switch-on: 0=Defrost start temperature display, 1=Defrost final temperature display *(ºC/ºF)* 0 0 1

**d6**
Defrost complex (0=Electric heat, 1=Hot gas by-pass) 0 0 1

**d7**
Defrost type: 0=Defrost, 1=Hot gas by-pass *(ºC/ºF)* 0 0 1

**d8**
Defrost complex (0=Defrost, 1=Hot gas by-pass) *(ºC/ºF)* 0 0 1

**EP**
Exit to Level 1

**Fan**
FANS control (Evaporator)

**F0**
Fans stop temperature by sensor 2 *(ºC/ºF)* 50.0 4.0 99.9

**F1**
Sensor 2 differential *(ºC/ºF)* 0.1 2.0 20.0

**F2**
Sensor 2 calibration *(ºC/ºF)* 0.1 2.0

**F3**
Fan speed by sensor 2 *(ºC/ºF)* 0 0 1

**F4**
Fan stop on defrost *(ºC/ºF)* 0 0 1

**EP**
Exit to Level 1

**AL**
ALARM control (Visual)

**A0**
Configuration of temperature alarms (0 = Relative to SP) *(ºC/ºF)* 0 0 1

**A1**
Maximum alarm in sensor 1 *(ºC/ºF)* A2 99.9 99.9

**A2**
Minimum alarm in sensor 1 *(ºC/ºF)* 50.0-50.0

**A3**
Temperature alarm delay in the start-up *(min.)* 0 0 120

**A4**
Temperature alarm delay from the end of a defrost *(min.)* 0 0 99

**A5**
Temperature alarm delay from the moment at which they should operate due to temperature *(min.)* 0 0 99

**A6**
Signals if defrost ends due to maximum time: (0=Defrost OFF) *(1=Defrost ON)* 0 0 1

**A7**
Defrost final temperature by sensor 2 *(ºC/ºF)* -50.0 8.0 99.9

**A8**
Defrost maximum duration (min.) 0 30 99

**A9**
Defrosting start temperature display *(ºC/ºF)* 02 22

**EP**
Exit to Level 1

**CN**
GENERAL STATUS

**P1**
Allocation of password to Set Point: *(0=Without allocation) *(1=With allocation)* 0 0 1

**P2**
Initial parameters: 1=Sets (continue to “set and exit programming”) 0 0 1

**P3**
Password request to enter programming parameters *(0=OFF) *(1=ON)* 0 0 1

**P4**
Password to parameters and information *(0=OFF) *(1=ON)* 0 0 1

**P5**
Password to programming *(0=OFF) *(1=ON)* 0 0 1

**P6**
Password to version *(0=OFF) *(1=ON)* 0 0 1

**EP**
Exit to Level 1

**L5**
Access to parameters and information *(0=OFF) *(1=ON)* 0 0 99

**L6**
Parameters transfer: (0=D isabled) *(1=Send) *(2=Receive)* 0 0 2

**PU**
Program version *(0=OFF) *(1=ON)* 0 0 1

**EP**
Exit to Level 1

**PA**
Password request to enter programming parameters *(0=OFF) *(1=ON)* 0 0 1

**dE**
Defrost during defrosting is being carried out. In order to display the defrosting time, it is essential that parameter d2 *≠ 0*, the relay will always be OFF disconnected.

**dF**
Defrost during defrosting is being carried out. In order to display the defrosting time, it is essential that parameter d2 *≠ 0*, the relay will always be ON connected.

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.

To transfer parameters, other servers are available for controllers that should be programmed identically in high quantity without power supply.

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

9- Warnings
The use of the unit without observing the manufacturer’s instructions may alter its safety qualification. The use of the unit without observing the manufacturer’s instructions may alter its safety qualification.

For more information, please visit our website: www.ako.com

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