



OKV  D163H232 Ed.08

- 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 at least 2 A, 230 V, 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)

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

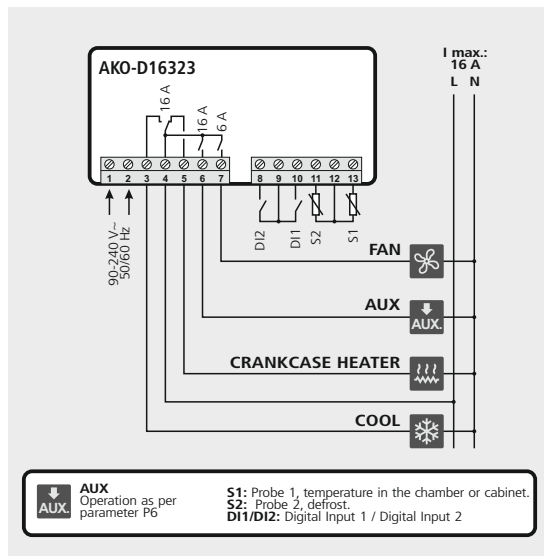


Diagram illustrating the control panel (AKO) and its terminal blocks:

- Status Indicators:**
 - FAN relay ON
 - COOL relay ON
 - DEF relay ON
 - Alarm ON
- Temperature indication:** A digital display showing two digits (e.g., 8.8).
- Terminal Blocks:**
 - UP (▲) / SET key
 - DOWN (▼) key
 - Terminal blocks for wiring connections.

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 **AKO** indicator is displayed on the screen.

In the programming menu, pressing for 5 seconds goes to the level displayed or, during the setting of a parameter, accepts the new value. In programming menu, pressing briefly allows you to scroll through the various levels or, during the setting of a parameter, to change the value.

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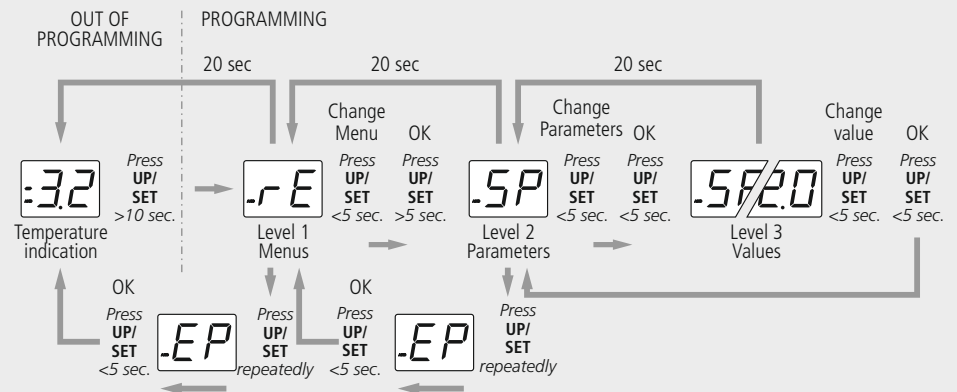
On power-up, the equipment will start in Wizard mode (Inl / 1 flashing), select the most appropriate application using the **UP** / **DOWN** keys and press **SET**.

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

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

The diagram shows a sequence of three LCD displays over time. A horizontal timeline at the top marks 5 seconds and 10 seconds. The first display shows ':32' with the label 'Temperature Indication' below it. The second display shows '-OF' with the label 'Release SET to go to Stand-by' below it. The third display shows '-Pr' with the label 'Release SET to access programming' below it. A vertical dashed line at the 5-second mark is labeled 'Keep UP / SET pressed'.

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.



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

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.

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)	(°C/°F)	-50 (-58°F)	★	99 (99°F)
	C0	Calibrating probe 1 (Offset)	(°C/°F)	-20	0.0	20
	C1	Probe 1 differential (Hysteresis)	(°C/°F)	0.1	2.0	20
	C2	Upper blocking of the set point (cannot be set above this value)	(°C/°F)	C3	99 (99°F)	99 (99°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=OFF-ON/ON-OFF (since the last shut-down /start-up)		0	0	1
	C5	Protection delay time (value of the option selected in parameter C4)	(min.)	0	0	99
	C6	Status of COOL relay with probe 1 fault 0=OFF; 1=ON, 2=Average based on last 24 hours prior to probe fault; 3=ON-OFF as prog. C7 and C8		0	2	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	99
	C8	Relay OFF time in the event of Probe 1 fault (If C8=0 and C7≠0, the relay will always be ON energised)	(min.)	0	5	99
	C9	Maximum duration of fast freezing mode. (0=off)	(h.)	0	24	48
	CA	Change set point (SP) in ECO mode (SP+C12 ≤ C3) (0=OFF) at this point (SP + CA), returns to normal. (SP+CA ≤ C3) (0=OFF)	(°C/°F)	0	-50 (-58°F)	C3-SP
	Cb	Length of inactivity at digital input to activate ECO mode (Only if PA or Pb=1 and P0=0) (0=OFF)	(h.)	0	2	24
	CC	Change set point (SP) in ECO mode (SP+CC≤ C2) (0=off)	(°C/°F)	0	2	C2-SP
	EP	Exit to Level 1				
dE	DEFROST control (if P0=0 Direct, Cold)					
	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	★	99
	d2	Type of message during defrost: 0=Current temperature, 1=temperature at start of defrost; 2=Display dE message		0	2	2
	d3	Maximum duration of message (Time added at the end of defrost)	(min.)	0	5	99
	d4	Defrost end temperature (as per probe 2) (if P4≠ 1)	(°C/°F)	-50 (-58°F)	8 (46°F)	99 (99°F)
	d5	Defrost on equipment start-up 0=NO, First defrost as per d0, 1=YES, First defrost as per d6		0	0	1
	d6	Defrost start delay on equipment start-up	(min.)	0	0	99
	d7	Defrost type: 0=Resistors, 1=Inverted cycle		0	0	1
	d8	Calculated time between defrost periods: 0=Total actual time; 1=Sum of times the compressor is on		0	0	1
	d9	Drip time at end of defrost (compressor and fans off) (if P4 ≠ 1)	(min.)	0	1	99
	EP	Exit to Level 1				
FA	FAN control (Evaporator) In two-relay models P6 must be set to zero					
	Level 3	Description	Values	Min.	Def.	Max.
	F0	Fan shut-down temperature as per probe 2 (if P4≠ 1)	(°C/°F)	-50 (-58°F)	★	99 (99°F)
	F1	Probe 2 differential (if P4 ≠ 1)	(°C/°F)	0.1	2.0	20
	F2	Stop fans when stopping compressor 0=No, 1=Yes		0	1	1
	F3	Fan status during defrost: (0=Off) (1=On)		0	★	1
	F4	Starting delay after defrost (if F3=0) Will only operate 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 port PA or P11=1).		0	0	1
	EP	Exit to Level 1				
AL	ALARMS control (visual)					
	Level 3	Description	Values	Min.	Def.	Max.
	A0	Configuration of temperature alarms (0=Relative to SP) (1=Absolute)		0	0	1
	A1	Maximum alarm probe 1 (must be greater than SP)	(°C/°F)	A2	99 (99°F)	99 (99°F)

Level 1 Menu and description						
A2	Minimum alarm probe 1 (must be less than SP)	(°C/°F)	-50 (-58°F)	-50 (-58°F)	A1	
A3	Temperature alarm delay during start-up.	(min.)	0	0	99	
A4	Temperature alarm delay after completion of a defrost.	(min.)	0	0	99	
A5	Temperature alarm delay after reaching the value of A1 or A2.	(min.)	0	30	99	
A6	External alarm / Severe external alarm delay when receiving digital input signal (PA or Pb=2 or 3)	(min.)	0	0	99	
A7	Delay on deactivation of external alarm / Severe external alarm when digital input signal disappears (PA or Pb=2 or 3)	(min.)	0	0	99	
A8	Show warning if defrost is terminated by time-out 0=No, 1=Yes		0	0	1	
A9	Alarm relay polarity 0=Relay ON in alarm (OFF no alarm) 1=Relay OFF on alarm (ON with no alarm)		0	0	1	
AA	Temperature Alarm Differential (A1 and A2)	(°C/°F)	0.1	1.0	20	
AC	Door open alarm delay (if PA or Pb=1)	(min.)	0	2	99	
EP	Exit to Level 1					
Cn	General status					
	Level 3	Description	Values	Min.	Def.	Max.
P1	Delay of all functions on receiving electrical power	(min.)	0	0	99	
P2	Access code (password) functions 0=Inactive; 1=Block access to parameters; 2=Keyboard lock		0	0	2	
In	Set the default parameters according to the type of application (see accompanying table) 1=Multipurpose 2=Frozen 3=Fruits and vegetables 4=Fresh fish 5=Soft drinks 6=Bottle racks 7=AC		1	-	7	
P4	Selection of type of input: 1=1 probe; 2=2 probes		1	2	2	
P5	Address (only systems with built-in communications)		0	0	99	
P6	Configuration of AUX relay 1=Defrost 2=Alarm 3=Light		0	1	3	
P7	Temperature display mode: 0=Whole in °C 1=One decimal in °C 2=Whole in °F 3=One decimal in °F		0	1	3	
P8	Probe to be displayed (as per parameter P4) 0=visualization of all the probes in sequence; 1=Probe 1; 2=Probe 2		1	1	2	
P9	Selection of probe type 0=NTC; 1=PTC		0	0	1	
PA	Configuring digital input 1 0=Off 1=Door contact 2=External alarm 3=Severe external alarm 4=Slave defrost 5=Act. ECO mode by pushbutton 6=Act. fast freezing 7=Not used 8=Remote defrost 9=Act. ECO mode by switch		0	0	9	
Pb	Configuring digital input 2 0=Off 1=Door contact 2=External alarm 3=Severe external alarm 4=Slave defrost 5=Act. ECO mode by pushbutton 6=Act. fast freezing 7=Not used 8=Remote defrost 9=Act. ECO mode by switch		0	0	9	
PC	Digital input polarity 1 0=Energised on closed contact, 1=Energised on open contact		0	0	1	
Pd	Digital input polarity 2 0=Energised on closed contact, 1=Energised on open contact		0	0	1	
PJ	Lights in ECO Mode (P6=3) 0=ON; 1=OFF		0	0	1	
EP	Exit to Level 1					
ti	Access and information control					
	Level 3	Description	Values	Min.	Def.	Max.
L5	Access code (Password)		0	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 (Inl)							
	1 Multipurpose	2 Frozen	3 Fruits and Vegetables	4 Fresh fish	5 Soft Drinks	6 Bottle racks	7 AC
SP	2 (36°F)	-18 (-0.4°F)	10 (50°F)	0 (32°F)	3 (37°F)	12 (54°F)	21 (70°F)
d0	4	4	4	4	24	24	96
d1	20	20	20	20	20	20	0
F0	8 (46°F)	0 (32°F)	30 (86°F)	8 (46°F)	8 (46°F)	30 (86°F)	99 (99°F)
F3	1	0	1	1	1	1	0

MESSAGES			
L5	Access code (Password) request	D	
EC	ECO mode ON	D	
dE	Indicates a defrost is underway. (Only if parameter d2=2)	D	
E1	Probe 1 faulty (open circuit, crossover or temperature outside the probe limits)	D	A
E2	Probe 2 faulty (open circuit, crossover or temperature outside the probe limits)	D	A
AH	Flashing: maximum temperature alarm on probe 1 (A1)	D	A
AL	Flashing: minimum temperature alarm on probe 1 (A2)	D	A
AE	External alarm activated (only if parameter PA or Pb=2)	D	A
AS	Severe external alarm activated (only if parameter PA or Pb=3)	D	A
Ad	Defrost time-out alarm (only if parameter A8=1)	D	
PA	Door open alarm (Only if PA or Pb=1 and as per time at AC)	D	

D: Shows the message on the display, A: Activates the alarm relay (if P6=2).

7- Technical specifications

Power supply 90-240V~ 50/60 Hz 7VA
Maximum Voltage SELV circuits 20V
Inputs 2 NTC/PTC inputs + 2 digital inputs
16A COOL relay (EN60730-1: 12(9)A 250V~)
6A FAN Relay (EN60730-1: 5(4)A 250V~)
16A AUX Relay (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 -50 to 100 °C 0.1 °C
> 100 °C 1 °C
Working environment -10 a 55 °C, humidity <90 %
Ambient storage humidity -30 a 70 °C, humidity <90 %
Class of protection - front panel IP40
Fixing Can be panel-mounted with anchors
Panel cutout dimensions 124 x 85 mm
Front panel dimensions 139 x 100 mm
Depth 40 mm
Connections Connections via 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 207 V, 17 mA
Current of radio jamming supression tests 270 mA