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AKO

16526A V2 Advanced Temperature Controller

AKO 16526A V2 Advanced Temperature Controller User Guide

Contents

AKO

AKO 16526A V2 Advanced Temperature Controller

Product Specifications

- **Model:** AKO-16526A V2 / AKO-16526AN V2
- **Type:** Advanced temperature and electronic expansion controller for cold room store
- **Edition:** 04

Product Usage Instructions

Display and Keypad
The device features a display and keypad for user interaction.

1. **Display:** Shows various messages and values.
2. **Keypad:** Used for inputting values and navigating through settings.

Alarms
The device indicates different types of alarms through the display:

- Fixed: HACCP alarm active.
- Intermittent: HACCP alarm registered and unconfirmed.
- To confirm an HACCP alarm, press the corresponding key.
- Temperature alarms are also displayed.

Setting Parameters
The device allows users to set various parameters:

- Control of compressor pump, defrost, and evaporator fan.
- Select different modes like demo mode or regular operation.
- Define the type of refrigerant gas used.

Connecting to akonet.cloud
For the AKO-16526AN V2 model, you can connect the controller to akonet.cloud:

1. To enable data transmission, the controller must be registered on akonet.cloud.
2. Press the ESC and SET keys simultaneously for 3 seconds to initiate the process.

Frequently Asked Questions (FAQ)

- **Q: How do I silence ongoing alarms?**

  A: To silence ongoing alarms, navigate to the alarm section on the display and follow the instructions provided.
- **Q: How can I change the setpoint temperature?**

  A: Use the keypad to access the temperature setting menu and adjust the setpoint value accordingly.

Safety Warnings

- If the device is used without adhering to the manufacturer's instructions, the device safety requirements could be compromised. Only probes supplied by AKO must be used for the unit to operate correctly.
- From -40 °C to +20 °C, if the NTC sensor is extended to 1000 m with at least a 0.5 mm2 cable, the maximum deviation will be 0.25 °C (cable for sensor extension ref. AKO-15586 / AKO-15586H. Earth the cable mesh at one end only).
- Pt1000 sensors can be extended up to 25 m using the AKO-15586 / AKO-15586H sensor extension cable.
- The product should be installed in a place protected from vibrations, water and corrosive gases, where the ambient temperature does not exceed the value indicated in the technical data.
- For the reading to be correct, the sensor should be used in a place without heat influences apart from the temperature you want to measure or control.
- The IP65 protection degree is only valid with the protection cover closed.
- The IP65 protection degree is only valid if the cables enter the device using a tube for electric conductions + gland with IP65 or above. The gland should be the right size for the diameter of the tube used.
- Do not spray the unit directly with high-pressure hoses, as this could damage it.
- This device must be installed in a location where a minimum distance of 20 cm to the human body can be guaranteed, in order to ensure compliance with standards on human exposure to electromagnetic fields.
- The AKO-16526AN device must NEVER be operating without the internal antenna. This device can be fitted with any antenna provided it has a gain of fewer than 9.2 dBi and there is a minimum distance of more than 20 cm between it and any person or animal. Any type of antenna used with this device must comply with the limits established for the radio interface in the Member States and the following documents: Commission Decision 2010/267/EU of 6 May 2010, ECC Decision (09)03 of 30 October 2009 and CEPT Report 30 of 30 October 2009.

Maintenance

- Clean the surface of the unit with a soft cloth, water and soap.
- Do not use abrasive detergents, petrol, alcohol or solvents, as this might damage the unit.

Wiring
Always disconnect the power supply to do the wiring. The probes and their cables must NEVER be installed in a conduit together with power, control or power supply cables.

- For disconnection, the power supply circuit must be equipped with at least a 2 A, 230 V switch, located near the device. The power supply cable shall be of the H05VV-F or NYM 1×16/3 type. The section to be used will depend on current local regulations, but should never be less than 1.5 mm2.
- Cables for relay or contactor outputs should have a section of 2.5 mm2, allow working temperatures equal to or

over 70ºC, and be installed with as little bending as possible.

- The 120 / 230 V~ wiring area must be kept clear of any other external element.
- The wiring setup depends on the options selected in the set-up wizard and on the input and output configurations (See page 31).
- Check the enclosed schematic and the defined configuration before wiring.
- The parameter St (Type of connected probes) affects all probe inputs. Therefore all connected probes (NTC or Pt1000) must be the same.

IMPORTANT:

- The AUXILIARY relays are programmable, and their operation depends on the configuration.
- The function of the digital inputs depends on the configuration.
- The recommended currents and powers are the maximum working currents and powers.

ATTENTION: When drilling the holes for the glands, take care to avoid damaging the internal components.

AKO-16526AN:
DO NOT DRILL ANY HOLES IN THE TOP OF THE DEVICE.

Description

- The AKO-16526A / 16526AN advanced controller for cold room stores has a SELFDRIVE operating mode that automatically controls (without parametrization) the fans and adaptively minimizes defrosts to optimise the performance of the cold room store: maximizing time in set point and minimizing costs linked to energy consumption and wear of components.
- It has an output to regulate the electronic expansion valve. It can be configured so it can control superheating, as well as adjust the cold in the store.
- The AKO-16526AN controller incorporates an NBIoT communication module that allows it to send operation data to akonet.cloud autonomously.

1: Display   2: Keypad
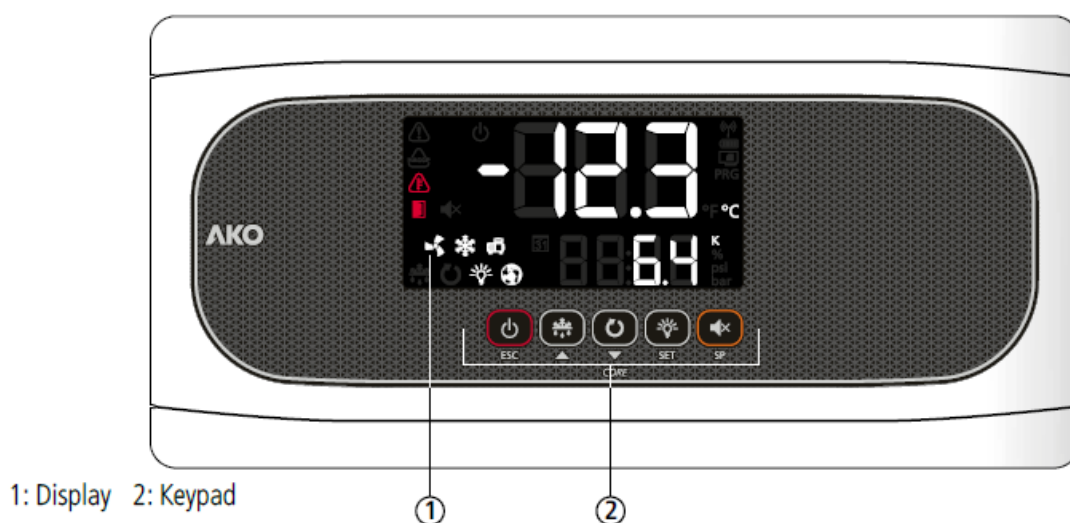
- ⏻ **Constant:** Stand-By Mode activated. Regulation is paused.

Flashing: Controlled stop process for the regulation in progress.

- **Constant:** Cold room door open.

  Flashing: The door has been open for a longer time than defined in parameter A12.

- There is an active alarm (No HACCP or temperature).

- **Constant:** HACCP alarm active.

  Flashing: HACCP alarm recorded and unconfirmed To acknowledge an HACCP alarm, press the ◀× key.

- The temperature alarm is active.

- **Constant:** Evaporator fans are active.

  Flashing: The evaporator fans should be active but something is preventing them from activating.

- **Constant:** The COOL relay is active.

  Flashing: The COOL relay should be active but a delay or protection is preventing this.

  Pulsing: Expansion valve regulated.

- **Constant:** The SELFDRIVE mode is active.

  Flashing: An error has been detected in SELFDRIVE mode. To view it, press the ▼ key.

- **Constant:** Compressor active.

  Flashing: The compressor should be active but a delay or protection is preventing this.

- Defrosting active.

- Continuous cycle mode is active.

- Cold room light active.

- The alarm in progress is muted.

- °F°C Temperature displayed in ° Fahrenheit / ° centigrade.

- PRG Programming mode active.

- K Lower display showing the real-time superheating value.

- % Lower display showing the percentage of EEV opening.

- bar psi Lower display showing low pressure in psi/bar.

- **ON:** Device registered on the NBIoT network and with a valid license.

  OFF: Unable to register on the NBIoT network or the license has expired.

Keypad

- **ESC** Press and hold for 3 seconds to activate/deactivate the Stand-By mode. In this mode, regulation is paused and the icon is displayed.

  In the programming menu, it exits the parameter without saving changes and returns to the previous level or exits programming.

- ▲ Pressing once without holding displays the temperature of sensor S2 for 10 seconds (if it is enabled). Pressing it for 3 seconds starts/stops the defrost.

  In the programming menu, it allows you to scroll through the different levels, or when setting a parameter to change its value.

- ▼ A brief press shows the SELFDRIVE mode errors.

  Pressing it for 3 seconds activates/deactivates the continuous cycle mode.

  In the programming menu, it allows you to scroll through the different levels, or when setting a parameter to change its value.

- **SET** Pressing once without holding activates/deactivates the cold room light.

  Pressing it for 3 seconds accesses the condensed programming menu.

  Pressing it for 6 seconds accesses the expanded programming menu.

  In the programming menu, it accesses the level shown on the display or, during the setting of a parameter, accepts the new value.

- **SP** Pressing it once without holding it down displays the current effective value of the temperature Set Point in the upper display and the superheating set point in the lower display, taking into consideration temporary changes due to other parameters.

  When an alarm is in progress, pressing once without holding mutes the acoustic alarm.

  Pressing for 3 seconds accesses the temperature Set Point setting.

- **ESC** **SET** **Only AKO-16526AN:** Pressing the SET and ESC buttons for 3 seconds forces the transmission to the cloud via NBIoT connectivity.

STAND-BY

If the regulation cannot be stopped immediately due to its configuration, a controlled stop process starts, and the icon flashes. To stop the controlled stop process and force Stand-by, press the Stand-by key again for 3

seconds.

Assistant

The first time the unit receives the power supply, it will enter into ASSISTANT mode. The display will show the message *InI* flashing at 0.

- The buttons ▲ and ▼ change the value, the SET button accepts the value and moves on to the next step.

- **Step 1:**

Select the most suitable InI option based on the type of installation to be carried out and press SET. The available options will be shown in the following table:

| InI | Type of installation | | | | Parameters | | | | | | | | | |
	Control of the compressor	Pump Down	Defrost	Vent. Evap.	Pd	o00	I00	I10	I11	I20	I21	d1	D7	F3
0	Demo mode: it displays the temperature but does not regulate the temperature													
1	No	No	Electric	Yes	0	0	2	0	0	0	0	20	0	0
2	Yes	Yes	Electric	Yes	1	1	2	7	1	0	0	20	0	0
3	Yes	No	Electric	Yes	0	1	2	0	0	0	0	20	0	0
4	No	No	Air	Yes	0	0	1	0	0	0	0	20	1	1
5	Yes	Yes	Air	Yes	1	1	1	7	1	0	0	20	1	1
6	Yes	No	Air	Yes	0	1	1	0	0	0	0	20	1	1
7	Yes	Yes	Hot gas	Yes	1	1	2	7	1	7	1	5	2	0
8	Yes	No	Hot gas	Yes	0	1	2	0	0	7	1	5	2	0

If options 2, 5, or 7 are chosen, check the configuration of parameter I11 according to the pressure switch type used.

- **Step 2:**

Define the type of refrigerant gas used.

u02=0	R404A	u02=1	R134A	u02=2	R407A
u02=3	R407F	u02=4	R410A	u02=5	R450A
u02=6	R513A	u02=7	R744	u02=8	R449A
u02=9	R290	u02=10	R32	u02=11	R448A
u02=12	R1234ze	u02=13	R23	u02=14	R717
u02=15	R407C	u02=16	R1234yf	u02=17	R22
u02=18	R454C	u02=19	R455A	u02=20	R507A
u02=21	R515B	u02=22	R452A	u02=23	R452B
u02=24	R454A				

- **Step 3*:**

Define the minimum value of the pressure sensor (I62) (Value at 4 mA, 0 V, 0.5 V, or 1 V according to I61).

- **Step 4*:**

Define the maximum value of the pressure sensor (I63) (Value at 20 mA, 5 V, 4.5 V, or 10 V according to I61).

*Steps only visible if u02=7

- **Step 5:**

Select the temperature set point.

- **Step 6:**

Set all other parameters to default.

  - dFP=0 No, the other parameters do not need to be changed.
  - dFP=1 Yes, set all other parameters to their default values.

This option only appears if this is not the first time the set-up wizard has been run. The initial configuration is now complete, and the device will start to regulate the temperature.

- The configuration wizard will not reactivate. To reactivate it, activate the standby mode (by pressing the ⏻ key for 3 seconds) wait until the unit completely halts regulation (the ⏻ indicator will light up permanently) and press the ▲, ▼, SET buttons in this order in sequence, not at the same time.
- If the Pump Down function is active, there may be a delay between the initiation of the Stand-by function and the moment the controller stops.

Registration on akonet.cloud (only AKO-16526AN)

- For the controller to be able to send operation data to akonet.cloud, it must be registered.

- To do this, go to **https://akonet.cloud** (requires registration), click on "Add new device" and continue with one of these two methods:
    - Enter the serial number (S/N) and validation code / IMEI that appear on the tag and press "Search".

    - Capture the QR code that appears on the tag using the option (requires having a camera on your PC, tablet, or mobile phone).
- These data are found on the tag on the right-hand side of the controller. More information can be found in the akonet.cloud user guide at: "**https://enhelpakonet.ako.com/**"
- To access **akonet.cloud**, enter this address in your browser (the use of Google Chrome is recommended): **https://akonet.cloud**.

Before activating the device, make sure that there is enough reception at the installation location. Activated devices may not be returned.

Forcing transmission

- When the steps of the configuration wizard and the registration process are completed in **akonet.cloud**, you must force a first transmission to verify the level of reception:
- Press and hold the ESC and SET keys for 3 seconds.

- After a moment, the display shows the quality of the NBIoT signal received:

Low quality	Medium quality	High quality	Communication error

The controller does not start transmitting data to **akonet.cloud** until the first transmission is forced.

Operation

Messages

Pd	Pump down malfunction error (Stop). The time configured in parameter **C20** has been exceeded. Only displayed on screen.
LP	Pump down malfunction error (Start). The time configured in parameter **C19** has been exceeded. Only displayed on screen.
E1-E6	Sensor 1, 2, 3, 4, 5 or 6 is faulty (open circuit, crossed circuit, or value outside sensor limits). Activates the alarm relay and the audible alarm.
AdO	Open door alarm. Only if the door stays open for a longer time than defined in parameter **A12**. Activates the alarm relay and the audible alarm.
AH	Maximum temperature in control sensor alarm. The temperature value programmed in **A1** has been reached. Activates the alarm relay and the audible alarm.
AL	Minimum temperature in control sensor alarm. The temperature value programmed in **A2** has been reached. Activates the alarm relay and the audible alarm.
AE	External alarm activated (by digital input) . Activates the alarm relay and the audible alarm.
AES	Severe external alarm activated (by digital input). Activates the alarm relay and the audible alarm.
Adt	Defrost time-out alert. The time set in **d1** has been exceeded.
HCP	HACCP alarm. The temperature has reached the value of parameter **h1** for a longer period than established in **h2**. Activates the alarm relay and the audible alarm.
HPF	HACCP alarm due to a fault in the electric supply. The temperature set in **h1** has been reached following a fault in the electric supply. Activates the alarm relay and the audible alarm.
LSH	Minimum superheat alarm. The value set in **A20** has been reached. Activates the alarm relay and the audible alarm.
HSH	Minimum superheat alert. The value defined in **A23** has been reached. Only displayed on screen.
MOP	Maximum evaporating pressure alarm. The value defined in **A26** has been reached. Activates the alarm relay and the audible alarm.

LOP Minimum evaporating pressure alarm. The value defined in **A29** has been reached. Activates the alarm relay and the audible alarm.

dEF Indicates that a defrost is being performed. Only displayed on screen.

PAS Password request. See parameters **b10** and **PAS** (See page 31). Only displayed on screen.

S1-S2 **Shown sequentially with the temperature:** The controller is in demo mode, the configuration has not been made.

CAL Calibration ongoing, therefore, avoid, as far as possible, opening the cold room during the process.

E16 Flashing light with temperature: Configuration has been changed from 1 to 2 evaporators or vice versa.

SELFDRIVE mode alert messages (Only shown by pressing the ▼ key)

E10/20 Defrost end error in 1/2 evaporator during the calibration, defrost has not ended due to temperature.

E11/21 Error during calibration in 1/2 evaporator. There is not enough difference in temperature between the cold room probe and the evaporator probe.

E12/22 It has not been possible to carry out the calibration due to a lack of stability in the system (Excessive door opening, excessive oscillations in the lower pressure, etc.).

E13/23 Error during normal operation (SELFDRIVE Mode active) in 1/2 evaporator. There is not enough difference in temperature between the cold room probe and the evaporator probe.

E14/24 A lack of stability has been detected in the system (Excessive door opening, excessive oscillations in the low pressure, etc.) during normal operation (SELFDRIVE Mode active).

E15/25 The persistent lack of stability has led to the deactivation of the SELFDRIVE mode.

E17 Excessive door openings have been detected during calibration and it has not been possible to calibrate.

E18 Excessive door openings have been detected and the device cannot regulate in SELFDRIVE mode.

Configuration

Condensed programming menu
This allows for the most-used parameters to be quickly configured. Press the SET key for 3 seconds to access it.

Condensed programming menu
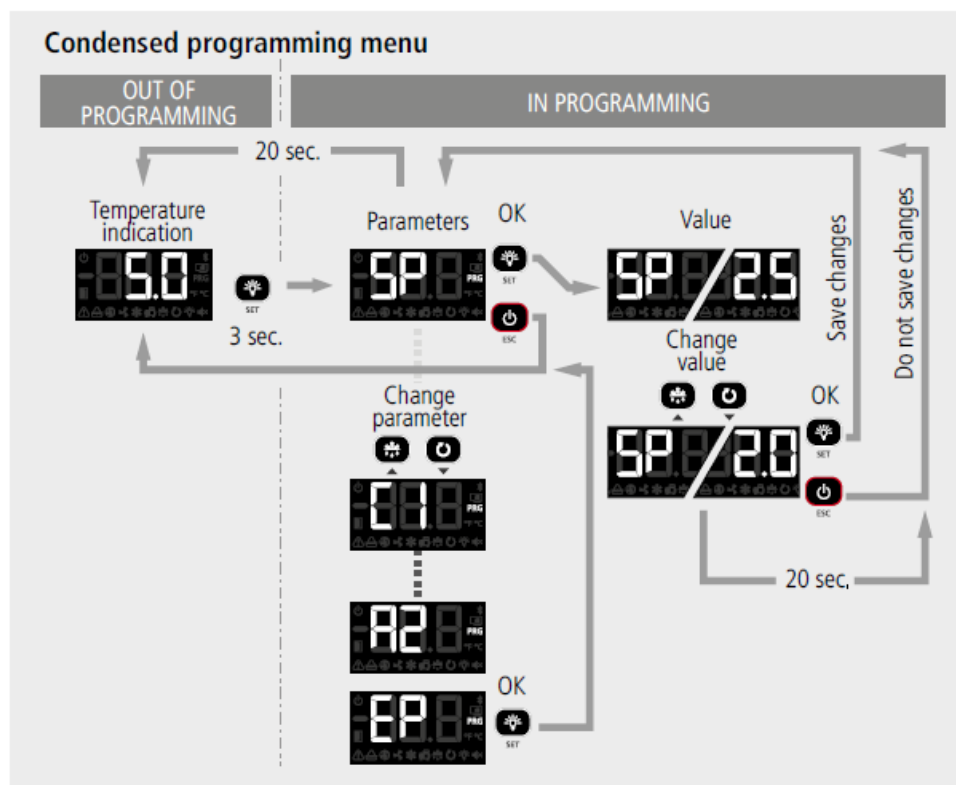
Parameters

Level 2	Description	Values	Min.	Def.	Max.
SP	Temperature setting (Set Point)	ºC/ºF	-50	0.0	99
CE	SELFDRIVE Mode 0=Deactivated 1= Activated		0	0	1
C1	Sensor 1 differential (Hysteresis)	ºC/ºF	1.0	2.0	20.0
d0	Defrost frequency (time between 2 starts)	h.	0	6	96
d1	Maximum defrost duration (0=defrost deactivated)	min.	0	*	255
d4	Final defrost temperature (by the sensor) (If I00 ¹ 1)	ºC/ºF	0	8.0	50
SH	Superheating set point	ºK	0.1	8	40
F3	Status of the fans during the defrost 0=Stopped; 1=Running		0	*	1
A1	Alarm for maximum in sensor 1 (it must be higher than the SP)	ºC/ºF	A2	99.0	99.0
A2	Alarm for minimum in sensor 1 (it must be lower than the SP)	ºC/ºF	-50	-50	A1
d30	Defrost strategy in SELFDRIVE mode		0	5	10

According to the set-up wizard.

Extended programming menu

Use the extended programming menu to configure all of the unit's parameters in order to adapt it to your installation requirements. Press the SET key for 6 seconds to access it.

- **IMPORTANT:** If the password function has been configured as a keypad lock (b10=2), or as an access to parameters block (b10=1), you will be requested to enter the password programmed in PAS when attempting to access either of the two functions. If the entered password is not correct, the unit will go back to showing the temperature.
- **IMPORTANT:** Certain parameters or menus may not be visible depending on the configuration of the other parameters and the options chosen during set-up.

Extended programming menu
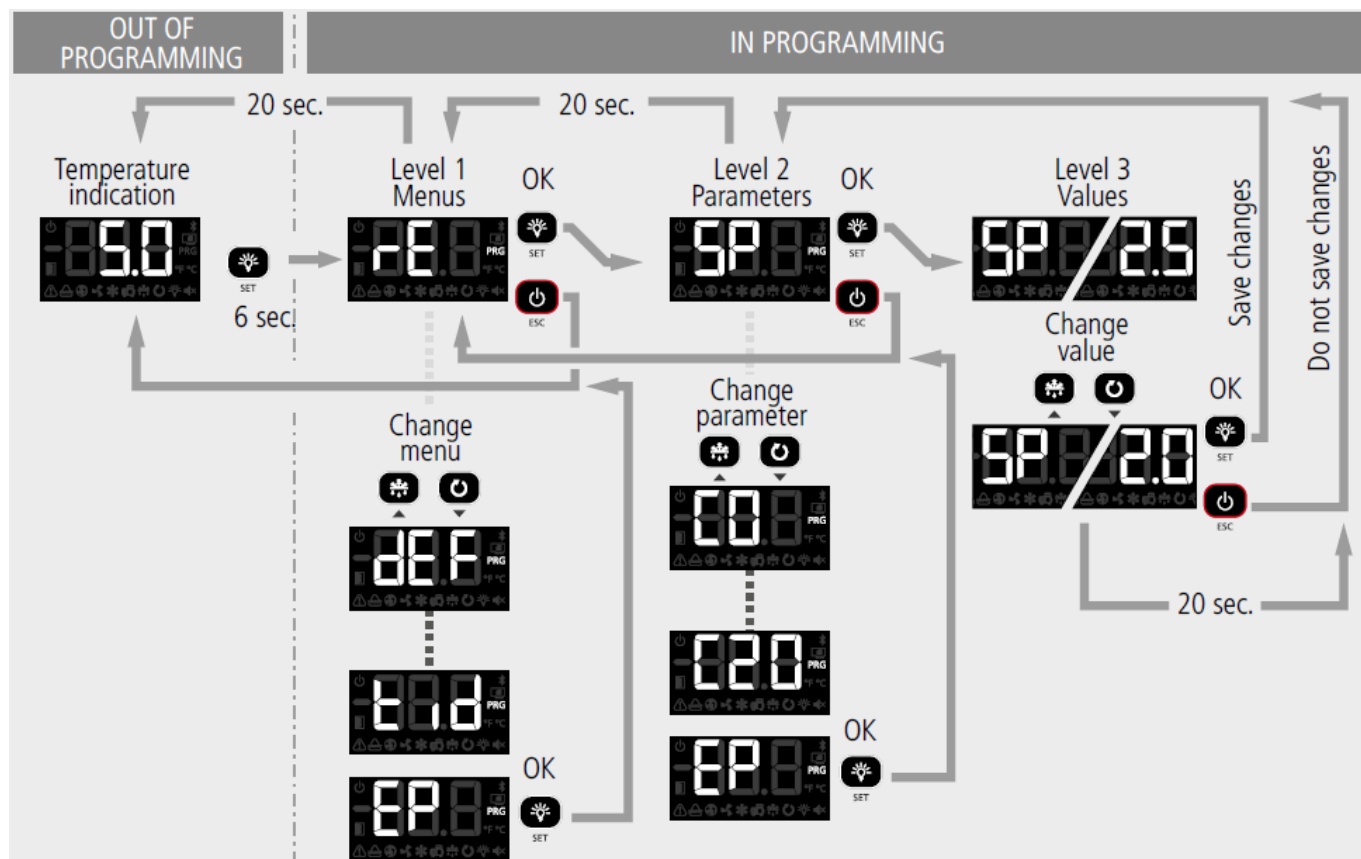
Parameters

Regulation and control

Level 1 Level 2		Description	Values	Min.	Def.	Max.
	SP	Temperature setting (Set Point)	ºC/ºF	-50	0.0	99
	CE	SELFDRIVE Mode 0=Deactivated 1= Activated		0	1	1
	C0	Sensor 1 calibration (Offset)	ºC/ºF	-4.0	0.0	4.0
	C1	Sensor 1 differential (Hysteresis)	ºC/ºF	1.0	2.0	20.0
	C2	Set point top locking (it cannot be set above this value)	ºC/ºF	C3	99	99

rE	**C3**	Set point bottom locking (it cannot be set under this value)	ºC/ºF	-50	-50	C2
	C4	Type of delay for the protection of the compressor: 0=Minimum OFF time of the compressor 1 = Minimum OFF and ON time of the compressor in each cycle		0	0	1
	C5	Protection delay time (Value of the option selected in parameter C4)	min.	0	0	120
	C6	COOL relay status with a fault in sensor 1: 0=OFF; 1=ON; 2=Average according to last 24 h before the sensor error; 3=ON-OFF according prog. C7 and C8		0	2	3
	C7	Time of relay ON if sensor 1 damaged (If C7=0 and C8¹0, the relay will always be OFF when disconnected)	min.	0	10	120
	C8	Time of relay OFF if sensor 1 damaged (If C8=0 and C7¹0, the relay will always be ON when connected)	min.	0	5	120
	C9	Maximum duration of the continuous cycle mode. (0=deactivated)	h.	0	0	48
	C10	Variation of the Set Point (SP) in continuous cycle mode. When it reaches this point (SP+C10), it reverts to the normal mode. (SP+C10 ³ C3). The value of this parameter is always negative unless it is 0. (0=OFF)	ºC/ºF	0	-50	C3-SP
	C12	Variation of the set point (SP) when the change set point change function is active. (SP+C12£ C2) (0= deactivated)	ºC/ºF	C3-SP	0	C2-SP
	C19	Maximum time for start-up after gas collection (Values between 1 and 9 seconds are not accepted) (0= Deactivated)	sec.	0	0	120
	C20	Maximum time for pump down (0= deactivated)	min.	0	0	15
	C22	Stop fans and COOL when opening door 0=No 1=Yes		0	0	1
	C23	Start-up delay for fans and COOL when door open	min.	0	0	999
	C24	The delay time of cold stop with the door open.	sec.	0	0	C23
	C25	Influence of probe S3 when regulating with two temperature probes (I20=10)	%	0	0	95
	C27	Sensor 4 calibration (Offset)	ºC/ºF	-4.0	0.0	4.0
	EP	Output to level 1				

Defrost

Level 1	Level 2	Description	Values	Min.	Def.	Max.
dEF	d0	Defrost frequency (time between 2 starts)	h.	0	6	96
	d1	Maximum defrost duration (0=defrost deactivated)	min.	0	*	255
	d2	Type of message during the defrost: 0=Sign of the real temperature; 1=Sign of the temperature at the start of the defrost; 2=Sample of the dEF message		0	2	2
	d3	Maximum message duration (Time added at the end of the defrost process)	min.	0	5	255
	d4	Final defrost temperature (by sensor) (If I00 ≠ 1)	ºC/ºF	0	8.0	50
	d5	Defrost on connecting the unit: 0=NO, First defrost according to d0; 1=YES, First defrost according to d6		0	0	1
	d6	Delay of the defrost start on connecting the unit	min.	0	0	255
	d7	Type of defrost: 0=Resistors; 1=Air / fans; 2=Hot gas		0	*	2
	d8	Time calculation between defrost periods: 0=Total real time 1=Sum of COOL time connected		0	0	1
	d9	Drip time when a defrost finishes (Stop COOL and fans)	min.	0	1	255
	d30	Defrost strategy in SELFDRIVE mode		0	5	10
	d31	Maximum time without defrosting (0=Deactivated)	h.	0	96	999
	d32	Maximum time of cold room outside the temperature regulation range (0=Deactivated)	h.	0	2	10
	EP	Output to level 1				

Evaporator fans

Level 1 Level 2		Description	Values	Min.	Def.	Max.
FAn	F0	Fans stop temperature	ºC/ºF.	-50	45	50
	F1	Sensor 2 differential if fans are stopped	ºC/ºF	0.1	2.0	20.0
	F2	Stop fans when the compressor stops 0=No 1=Yes		0	0	1
	F3	Status of the fans during the defrost 0=Stopped; 1=Running		0	*	1
	F4	Start-up delay after defrost (if F3=0) Only actuates if higher than d9	min.	0	2	99
	EP	Output to level 1				

According to the set-up wizard.

Expansion valve

Level 1 Level 2		Description	Values	Min.	Def.	Max.
EEV	u00	Valve type: 1=PWM-type EEV 2=Stepper-type EEV		1	1	2
	SH	Superheating set point	K	0.1	8	40
	u02	Refrigerant gas type: 0= R-404A, 1= R-134A, 2= R-407A, 3= R-407F, 4= R-410A, 5= R-450A, 6= R-513A, 7= R-744, 8= R-449A, 9= R-290, 10= R-32, 11= R-448A, 12=R1234ze, 13=R23, 14=R717, 15=R407C, 16=R1234yf, 17=R22, 18=R454C, 19=R455A, 20=R507A, 21=R515B, 22=R452A, 23=R452B, 24=R454A		0	*	24
	u03	PWM cycle time	s.	2	6	10
	u04	Proportional constant value (P)		1	10	100
	u05	Integral constant value (I)		0	10	100
	u06	Derivative constant value (D)		0	0	100
	u07	Opening value of the electronic expansion valve when cooling is activated	%	u13	50	u12
	u08	Duration of valve opening on cooling demand	s.	2	5	240
	u09	Valve opening value with sensor error S5 or S6: 0=Fixed opening according to u10; 1=Average opening over the last 24 hours		0	0	1
	u10	Valve opening value with sensor error S5 or S6 (if u09=0)	%	u13	0	u12
	u11	Manual valve opening value (0=Disabled), (cycles acc. to u03)	%	u13	0	u12
	u12	Maximum valve opening value	%	u13	100	100
	u13	Minimum valve opening value	%	0	0	u12
	u14	Valve opening value after defrost (0=Disabled), (duration according to u15)	%	0/ u13	0	u12
	u15	Duration of valve opening after defrosting	s	0	0	240
	u16	Valve opening in case of LOP error (0=valve closed)	%	0/ u13	0	u12
	EP	Output to level 1				

Alarms

Level 1 Level 2		Description	Values	Min.	Def.	Max.

	A0	Configuration of the temperature alarms 0=Relative to SP 1=Absolute		0	1	1
	A1	Alarm for maximum in sensor 1 (it must be higher than the SP)	ºC/ºF	A2	99.0	99.0
	A2	Alarm for minimum in sensor 1 (it must be lower than the SP)	ºC/ºF	-50	-50	A1
	A3	Delay of temperature alarms in the start-up	min.	0	0	120
	A4	Delay of temperature alarms from the end of a defrost	min.	0	0	99
	A5	Delay of temperature alarms from when the A1 or A2 value is reached	min.	0	30	99
	A6	Delay of external alarm/severe external alarm on receiving digital input signal (I10 or I20=2 or 3)	min.	0	0	120
	A7	External alarm deactivation delay / Severe external alarm on the disappearance of the signal at digital input (I10 or I20=2 or 3)	min.	0	0	120
	A8	Show warning if the defrost ends for maximum time 0=No 1=Yes		0	0	1
	A9	Polarity relay alarm 0= Relay ON in alarm (OFF without alarm); 1= Relay OFF in alarm (ON without alarm)		0	0	1
	A10	Differential of temperature alarms (A1 and A2)	ºC/ºF	0.1	1.0	20.0
	A12	Delay of open door alarm (if I10 or I20=1)	min.	0	10	120
	A20	Minimum superheating value for LSH alarm	K	0	2	SH
AL	**A21**	LSH alarm activation delay	sec.	0	30	240
	A22	LSH alarm hysteresis	K	0.1	2	Sh-A20
	A23	Maximum superheating value for HSH warning	K	sh	40	40
	A24	Delayed activation of the HSH warning	s	0	30	240
	A25	HSH alarm deactivation hysteresis	K	0.1	2	A23-sh
	A26	Maximum evaporating pressure (MOP)	bar	0	60	60
	A27	MOP alarm activation delay (Delay time for activating alarm after threshold has been exceeded)	sec.	0	30	240
	A28	MOP alarm deactivation hysteresis (When the pressure drops below the MOP-hysteresis level the alarm is deactivated)	bar	0.1	1	60
	A29	Minimum evaporating pressure (LOP)	bar	-1	0	8

A30	LOP alarm activation delay (Delay time for activating alarm after threshold has been exceeded)	sec.	0	30	240
A31	LOP alarm deactivation hysteresis (When the pressure exceeds the LOP+ hysteresis level the alarm is deactivated)	bar	0.1	1	8
EP	Output to level 1				

Basic configuration

		Description	Values	Min.	Def.	Max.
Level 1 / bcn	**b00**	Delay of all functions on receiving power supply	min.	0	0	255
	b01	Cold room light timing	min.	0	0	999
	b10	Password function 0=Inactive 1=Block access to parameters 2=Lock keypad		0	0	2
	PAS	Password		0	0	99
	b20	MODBUS address		1	1	247
	b21	Communication speed: 0=9600 bps 1=19200 bps 2=38400 bps 3=57600 bps	bps	0	0	3
	b22	Audible alarm enabled 0= No 1=Yes		0	1	1
	b23	Lower display function: 1=sensor S2, 2=sensor S3, 3=sensor S4, 4=sensor S5, 5=Superheating, 6=Pressure sensor, 7=% EEV, 9=Carousel, 10 = Off		1	*	10
	b30	Activation of manual calibration 0=Deactivated 1= Activated Requires security code		0	0	1
	Unt	Working units 0=°C 1=°F		0	0	1
	EP	Output to level 1				

(Level 2 header spans b00–EP rows; Level 1 label spans the bcn block)

Inputs and outputs

Level 1 Level 2		Description	Values	Min.	Def.	Max.
InO	**St**	Type of probes connected: 0= NTC, 1= Pt1000		0	0	1
	I00	Probes connected: 1=Sensor 1 (cold room), 2=Sensor 1 (cold room) + Sensor 2 (evaporator)		1	2	2
	I10	D1 / S3 input configuration: 0=Deactivated, 1=Door contact, 2=External alarm, 3=Severe external alarm, 4=Change SP, 5=Remote defrost, 6=Defrost lockout, 7=Low pressure switch, 8=Remote activation in standby mode, 9=Product temperature		0	*	9
	I11	Digital input polarity D1: 0=Activates on closing, 1=Activates on opening contact		0	0	1
	I20	D2 / S4 input configuration: 0=Deactivated, 1=Door contact, 2=External alarm, 3=Severe external alarm, 4=Change SP, 5=Remote defrost, 6=Defrost lockout, 7=High pressure switch for hot gas, 8=Remote activation of standby mode, 9=Product temperature, 10=Defrost 2nd evaporator, 11=2nd cold room temperature probe		0	*	11
	I21	Digital input polarity D2: 0=Activates on closing, 1=Activates on opening contact		0	0	1
	I60	Pressure units: 0= bar, 1= Psi		0	*	1
	I61	Pressure sensor type (S6): 0= Deactivated, 1= 4-20 mA, 2= 0-5 V, 3= 0.5-4.5 V, 4= 0-10 V, 5= 1-5 V		0	3	5
	I62	Minimum pressure sensor value (4mA, 0V, 0.5V, 1)		-1	-1	I63
	I63	Maximum pressure sensor value (20mA, 5V, 4.5V, 10V)		I62	9	60
	I64	Pressure sensor calibration (S2)		-10	0	10

According to the set-up wizard.

Inputs and outputs

		Description	Values	Min.	Def.	Max.
In0	o00	AUX1 relay configuration: 0= Deactivated, 1= Compressor/Crankcase resist- ance, 2= Light, 3= Virtual control, 4= Alarm, 5= Door frame resistor, 6=Drainage resistor		0	*	6
	o10	AUX2 relay configuration: 0= Deactivated, 1= Alarm, 2= Light, 3= Virtual control, 4= Defrost 2nd evaporator, 5= Door frame resistor, 6= Equal solenoid status, 7= Equal device status, 8=Drainage resistor		0	2	8
	o20	AUX3 relay configuration: 0= Deactivated, 1= Alarms, 2= Light, 3= External AO controller ON/OFF, 4=Defrost 2nd evaporator, 5= Door frame resistor, 6=Drainage resistor		0	0	6
	o30	Analog output type (AO): 0= 4-20mA, 1= 0-10V		0	0	1
	EP	Output to level 1				

HACCP alarm

Level 1	Level 2	Description	Values	Min.	Def.	Max.
HCP	h1	HACCP alarm maximum temperature	°C/°F	-50	99.0	99.0
	h2	Maximum permitted time for activation of the HACCP alarm (0=HACCP alarm deactivated)	h.	0	0	255
	EP	Output to level 1				

Information (read-only)

Level 1 / Level 2		Description	Values	Min.	Def.	Max.
tid	InI	The option is chosen in the configuration wizard				
	Pd	Pump down active? 0=No, 1=Yes				
	PU	Program version				
	Pr	Program revision				
	PSr	Program supervision				
	bU	Bootloader version				
	br	Bootloader revision				
	bSr	Bootloader subdivision				
	PAr	Parameter map revision				
	EP	Output to level 1				

* According to the set-up wizard.

Technical specifications

- Power supply…………………………………………………………………………………………… 100 – 240 V ~ 50/60 Hz
- Maximum input power in the operation…………………………………………………………………..8.1 VA
- Maximum nominal current…………………………………………………………………………………….15 A
- DEF relay – SPDT – 20 A NO (EN 60730-1: 15 (15) A 250 V~) NC………………………………………………… (EN 60730-1: 15 (13) A 250 V~)
- FAN relay – SPST – 16 A (EN 60730-1: 12 (9) A 250 V~)
- Relay COOL – SPST – SSR 2 A Vmax: 275 V~, Imax: 2 A
- AUX relay 1 – SPDT – 20 A
- AUX relay 2 – SPDT – 16 A
  - NO…………………………………………………(EN 60730-1: 15 (15) A 250 V~)
  - NC…………………………………………………(EN 60730-1: 15 (13) A 250 V~)
  - NO………………………………………………..(EN 60730-1: 12 (9) A 250 V~)
  - NC………………………………………………..(EN 60730-1: 10 (8) A 250 V~)
- AUX relay 3 – SPST – 16 A NO…………………………………………………..(EN 60730-1: 12 (9) A 250 V~)
- No. of relay operations……………………………………………………………………EN 60730-1:100,000 operations
- Sensor temperature range……………………………………………………………………………-50.0 ºC to 99.9 ºC
- Resolution, adjustment, and differential………………………………………………………………………… 0.1 ºC
- Thermometric accuracy……………………………………………………………………………………………±1 ºC
- Tolerance of the NTC probe at 25 ºC…………………………………………………………………..±0.4 ºC
- Input for NTC probe…………………………………………………………………………………..AKO-14950 / AKO-14950-8
- Working ambient temperature ……………………………………………………………………………………..-10 ºC to 50 ºC
- Ambient storage temperature……………………………………………………………………………………-30 ºC to 60 ºC
- Protection degree …………………………………………………………………………………………………… IP 65
- Installation category………………………………………………………………………………………………… II as per EN 60730-1
- Degree of pollution………………………………………………………………………………………………… II as per EN 60730-1

- Grade as per UNE-EN 60730-1: Built-in control device, with Type 1.B automatic action operation feature, for use in clean situations, logical support (software) class A, and continuous operation. Degree of pollution 2.
- Double isolation between power supply, secondary circuit, and relay output.
- Accessible parts pressure ball test temperature…………………………………………………………………………………………… 75 °C
- Parts positioning active elements………………………………………………………………………………………………….. 125 ºC
- Radio interference suppression test current…………………………………………………………………………………….270 mA
- Voltage and current delayed by the EMC tests:……………………………………………………………………………… 207 V, 17 mA
- Type of mounting……. Fixed interior
- MODBUS address……… indicated on the label
- Dimensions……………………………………………………………………………………………….. 290 mm (W) x 141 mm (H) x 84.4 mm (D) Internal buzzer

AKO-16526AN

- Maximum transmission power………………………………………………………………………………………………… 23.5 dBm conducted
- Antenna…… Internal
- Bands………………………………………………………………………… NBIoT (Narrow band) LTE Cat NB1 | B2, B3, B4, B8, B12, B13, B20

Band/Rx Frequency/Tx Frequency

- 2……………… 1930 MHz ~ 1990 MHz…………….. 1850 MHz ~ 1910 MHz
- 3……………… 1805 MHz ~ 1880 MHz…………….. 1710 MHz ~ 1785 MHz
- 4……………… 2110 MHz ~ 2155 MHz…………….. 1710 MHz ~ 1755 MHz
- 8……………….. 925 MHz ~ 960 MHz………………… 880 MHz ~ 915 MHz
- 12……………….. 729 MHz ~ 746 MHz………………… 699 MHz ~ 716 MHz
- 13……………….. 746 MHz ~ 756 MHz………………… 777 MHz ~ 787 MHz
- 20……………….. 791 MHz ~ 821 MHz………………… 832 MHz ~ 862 MHz

For further information, refer to the user manual available at:
https://help.ako.com/assets/uploads/3516526A32.pdf.

Declaration Of Conformity

Simplified declaration of conformity

- AKO Electromecánica S.A. hereby declares that the radioelectric device types AKO-16526AN (Advanced temperature controller for cold rooms with NBIoT communication) conform to the provisions set forth by Directive 2014/53/EU.
- The full text of the EU conformity declaration is available at the following internet address: **http://help.ako.com/manuales/declaracion-ue-de-conformidad**.

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- **www.ako.com**.

We reserve the right to supply materials slightly different from those described in our Data Sheets. Updated information in our website.

Documents / Resources

AKO 16526A V2 Advanced Temperature Controller [pdf] User Guide
16526A V2 Advanced Temperature Controller, 16526A V2, Advanced Temperature Controller, Temperature Controller, Controller

References

- 🌐 **AKONET.Cloud**
- 🖼️ **akonet.cloud help**
- 🖼️ **Ayuda de akonet.cloud**
- 🖼️ **Aide d' akonet.cloud**
- **User Manual**