AKO 1652H4A11 Temperature Controller User Guide

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AKO-16524A AKO-16525A AKO-16525AN

Controlador avanzado de temperatura para cámara frigorífica

Advanced temperature controller for cold rooms

Contrôleur avancé de température pour chambre froide

Guía rápida / Quick guide / Guide rapide

AKO

Contents

Warnings

⚠ -If the equipment 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 ºC to +20 °C, if the NTC probe is extended to 1000 m with at least a 0.5 mm2 cable, the maximum deviation will be 0.25 ºC (cable for probe extension ref. AKO-15586. Earth the cable mesh at one end only).
-Only NTC type probes supplied by AKO must be used for the appliance to operate correctly.
-It must 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 probe must be used in a place without thermal influences apart from the temperature you want to measure or control.
-IP65 protection degree is only valid with the protection cover closed.
-The IP65 protection degree is only valid if the cables enter the device through a tube for electric conduits + gland with IP65 or above. The size of the glands must be suitable 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-16525AN device must NEVER be operating without the internal antenna. This device can be fitted with any antenna provided it has a gain of less 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 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

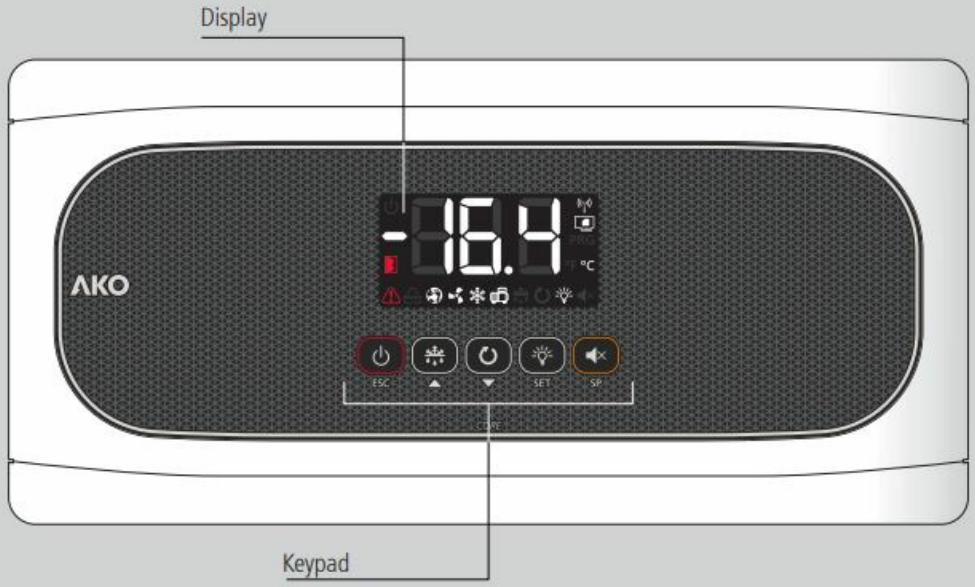
⚠ Always disconnect the power supply to do the wiring. The probes and their cables must NEVER be installed in a conduit together with power, control or power supply cables. For disconnection, the power supply circuit must be equipped with at least a 2 A, 230 V switch, located near the device. The power supply cable shall be of the H05VV-F or NYM 1×16/3 type. The cross-section to be used will depend on the local regulations in force, but must never be less than 1.5 mm2. Cables for relay or contactor outputs must have a cross-section of 2.5 mm2 and allow working temperatures equal to or over 70 °C and must 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 to be undertaken depends on the option selected in the initial configuration wizard (See page 23). Use the appropriate diagram based on the option selected. Check the available options on the diagram sheet included with your device.
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-16525AN: DO NOT DRILL ANY HOLES IN THE TOP OF THE DEVICE.

Description



Indicators

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, but not an active HACCP alarm.

Constant: HACCP alarm active.
Flashing: HACCP alarm recorded and unconfirmed. Press the key to confirm an HACCP alarm.

Constant: The SELFDRIVE mode is active.
Flashing: An error has been detected in the SELFDRIVE mode.

Constant: Evaporator fans active.
Flashing: The evaporator fans should be active but a delay is preventing this.

Constant: The cold solenoid is active.
Flashing: The solenoid should be active but a delay or protection is preventing this.

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

Defrost relay active.

Continuous cycle mode active.

Cold room light active.

Alarm in progress muted.

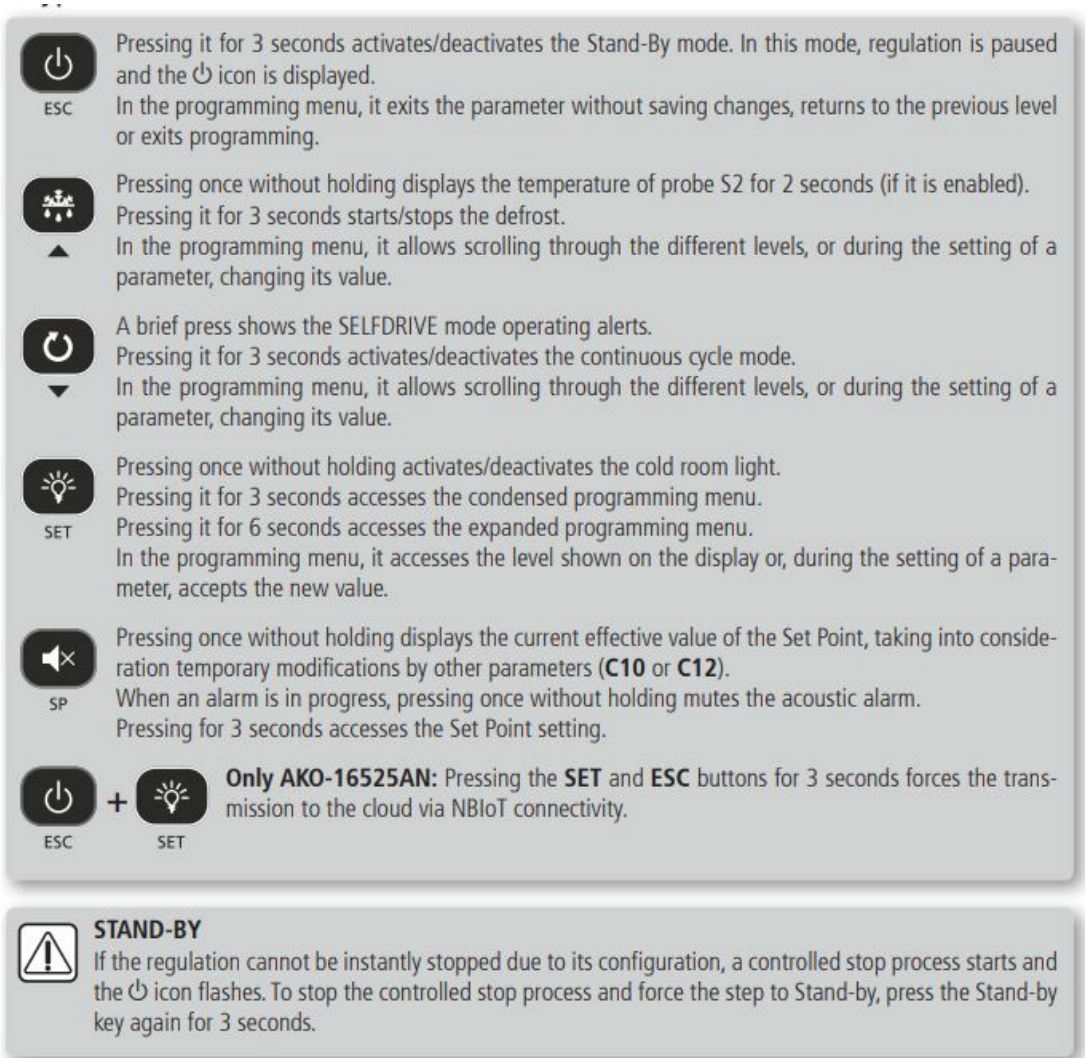
°F °C Temperature displayed in ° Fahrenheit / ° Centigrade.

PRG Programming mode active.

Constant: CAMM module in operation.
Flashing: Malfunction in CAMM module.

AKO-16524A, AKO-16525A: Bluetooth activated (only with CAMM module).
AKO-16525AN : **ON:** Device registered on the NBIoT network and with a valid licence.
OFF: Unable to register on the NBIoT network or the licence has expired.

Keypad



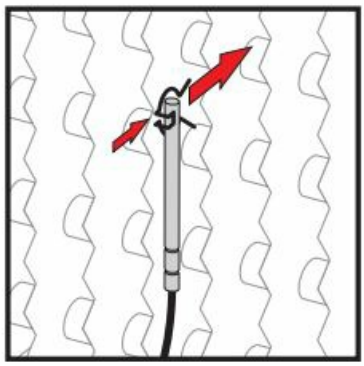
Installation of the probes

To achieve maximum performance from the advanced controller, the correct installation of the probes is key, as they are responsible for calculating the evaporator's thermal transfer coefficient, evaluating the start and end of the defrosts and diagnosing problems in the evaporator.

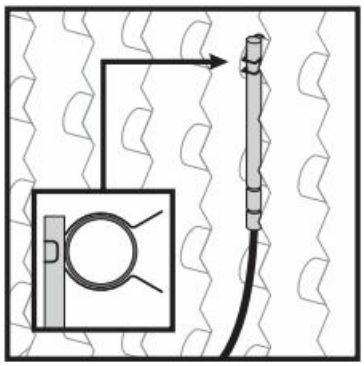
Material included
-4 mm hermetic evaporator probe, 1.5 m of cable.
-Ambient probe
-1 mounting clip for 10-13 mm coil
-1 mounting clip for 14-18 mm coil
-1 mounting clip for 19-21 mm coil
-1 mounting clip for 22-25 mm coil

Location of the ambient probe
The probe should be located in a place that does not directly receive the flow of cold air from the evaporator. Preferably in its air aspiration area.

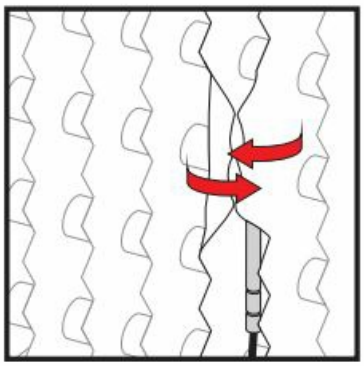
Location of the evaporator probe
The probe must be located as near as possible to the inlet of refrigerant from the evaporator (close to the expansion valve) in the finned area. In certain evaporators, for example cubic ones, this inlet may be located on the front part of the battery, just behind the fan. If defrost is done by electric heat, the probe must be located far away from them and, if possible, in the area of the evaporator where defrosting is slower, in other words, in the last area to defrost. If the two conditions are not possible, the best possible compromise must be looked for.



Select the appropriate clip depending on the size of its evaporator pipe.



Attach the probe to the pipe using the clip, making sure that its end is in direct contact with the tube.



Bend the fins of both ends of the probe to increase the fixing and contact surface.

Initial configuration (wizard)

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**.

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										Diagram to be used
	Cold regulation	Pump Down	Defrost	Evaporator fans	Pd	o00	I00	I10	I11	I20	I21	d1	d7	F3	
0	Demo mode: it displays the temperature but does not regulate the temperature or activate relays.														
1	Solenoid	No	Electric	Yes	0	0	2	0	0	0	0	20	0	0	A
2	Solenoid + compressor	Yes	Electric	Yes	1	1	2	7	1	0	0	20	0	0	B
3	Solenoid + compressor	No	Electric	Yes	0	1	2	0	0	0	0	20	0	0	B
4	Solenoid	No	Air	Yes	0	0	2	0	0	0	0	20	1	1	A
5	Solenoid + compressor	Yes	Air	Yes	1	1	2	7	1	0	0	20	1	1	B
6	Solenoid + compressor	No	Air	Yes	0	1	2	0	0	0	0	20	1	1	B
7	Solenoid + compressor	Yes	Hot gas	Yes	1	1	2	7	1	9	1	5	2	0	C
8	Solenoid + compressor	No	Hot gas	Yes	0	1	2	0	0	9	1	5	2	0	C

If options 2, 5, or 7 are chosen, check the configuration of parameter I11 according to the pressure switch type used. (See diagram included with the device).

Step 2:

Use keys ▲ and ▼ to enter the desired Set Point value and press **SET**. The configuration wizard has finished. The unit will begin to regulate the temperature.

If this is not the first time you run the wizard, after completing the last step the display will show the message *dFP* (default parameters). You may choose between two options:

0: Only change the parameters which affect the wizard. The other parameters will remain the same.

1: All parameters return to their factory setting except those which have been modified by the wizard.

The configuration wizard will not reactivate. To reactivate it, activate the Stand-By mode (by pressing the m key for 3 seconds) and wait until the unit completely halts regulation (the m indicator will light up permanently) and press in this order the following keys (one after the other, not at the same time) ▲, ▼ and **SET**.

STAND-BY

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

Registration on akonet. cloud (only AKO-16525AN)

In order 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:

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

Operation

MESSAGES	
	Pump down malfunction error (stop), the time configured in parameter C20 has been exceeded. Only displayed on screen.
	Pump down malfunction error (start-up), the time configured in parameter C19 has been exceeded. Only displayed on screen.
	Probe 1/2/3 failure (open circuit, crossed circuit or temperature outside the limits of the probe) (Equivalent limits in °F). Only E2 and E3: Damp evaporator probe. Activates the alarm relay and the audible alarm. **Flashing with temperature:** Probe error 1/2/3 in SELFDRIVE mode. **Flashing with CAL**: Probe error 1/2/3 during the calibration.
	Open door alarm. Only if the door remains open for a longer time than defined in parameter A12. Activates the alarm relay and the audible alarm.
	Maximum temperature in control probe alarm. The temperature value programmed in A1 has been reached. Activates the alarm relay and the audible alarm.
	Minimum temperature in control probe alarm. The temperature value programmed in A2 has been reached. Activates the alarm relay and the audible alarm.
	External alarm activated (by digital input). Activates the alarm relay and the audible alarm.
	Severe external alarm activated (by digital input). Activates the alarm relay and the audible alarm.
	Alarm for defrost completed due to time-out. The time set in d1 has been exceeded.
	HACCP alarm. The temperature has reached the value of parameter h1 during a longer period than established in h2. Activates the alarm relay and the audible alarm.
	HACCP alarm due to a power supply failure. The temperature established in h1 has been reached, following a power supply failure. Activates the alarm relay and the audible alarm.
	HACCP alarm due to a power supply failure. The temperature established in h1 has been reached, following a power supply failure. Activates the alarm relay and the audible alarm.
	Indicates that a defrost is being performed. Only displayed on screen.
	Password request. See parameters b10 and PAS. Only displayed on screen.
	**Shown sequentially with the temperature:** The controller is in demo mode, the configuration has not been made.

MESSAGES	
CAL	Calibration ongoing, therefore, avoid, as far as possible, opening the cold room during the process. For further information, see page 27.
E16	**Flashing with temperature**: Configuration has been changed from 1 to 2 evaporators or vice versa.
SELFDRIVE MODE ALERT MESSAGES (Only shown pressing the ▼ key)	
E10/E20	Defrost end error in 1/2 evaporator during the calibration, defrost has not ended due to temperature.
E11/E21	Error during calibration in 1/2 evaporator. There is not enough difference in temperature between the cold room probe and the evaporator probe.
E12/E22	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/E23	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/E24	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/E25	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.

SELFDRIVE mode

SELFDRIVE modeIf the SELFDRIVE mode is activated (default configuration), the device periodically evaluates the evaporator's heat transfer, managing the available resources to maximise it. The defrosts are minimised, adapting to the changing conditions of the cold room, reducing heat input into the refrigerated space, thermal stress in the evaporator and energy consumption. Operation of the evaporate fans is optimised taking into account the compressor status, evaporate temperature, frost level, opening of the door, etc. The control function of the drainage resistor minimises its activation (moments before starting a defrost), thereby reducing energy consumption. To achieve correct operation of the SELFDRIVE mode, it is very important for the probes to be correctly installed, as described on page 22.

Calibration

During the first hours of operation, the device performs two calibrations automatically, during which the display shows the CAL.message. Calibration may take several hours and include several refrigeration and defrost cycles.

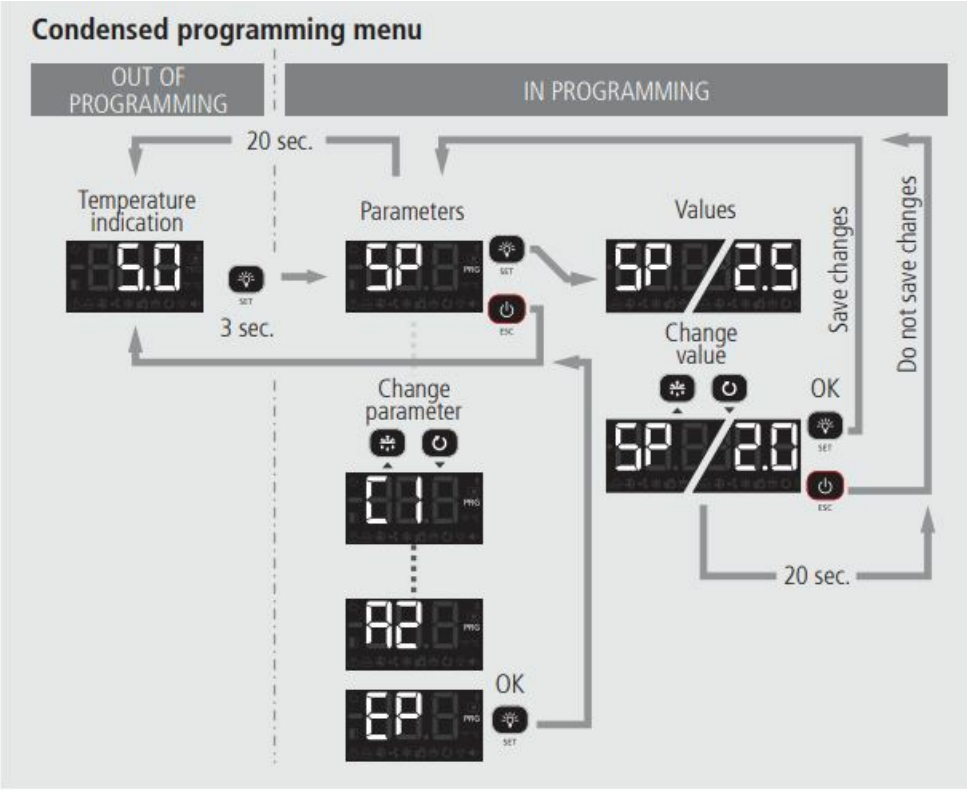
IMPORTANT:
⚠ During the calibration processes, the following should be avoided:
-Opening the cold room door
-Turning the controller off or putting it on stand-by
-Changing controller parameters, including the set point
⚠ While the calibration process is active:
-Manual defrost cannot be activated (H key)
-The continuous cycle cannot be activated
-The set point change function cannot be activated
If calibration cannot be performed, or if an important part of the installation is replaced (compressor, evaporator, etc.) it is advisable to perform a manual calibration. It is also recommended (not essential) to perform a manual calibration, once the installation has completed its commissioning, with a load inside it and when its operating temperature has been stabilised, after several days of operation, in this way calibration is optimal. In the event of changing the set point or hysteresis, the device performs a calibration again automatically, except if the set point change is made using the “set point change mode” function. To perform a manual calibration, access the parameter menu (See page 29) and follow the sequence indicated below:

- Access parameter b30
- A security code is requested, enter code 63
- Using keys ▲ and ▼ select option 1 and press SET

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.



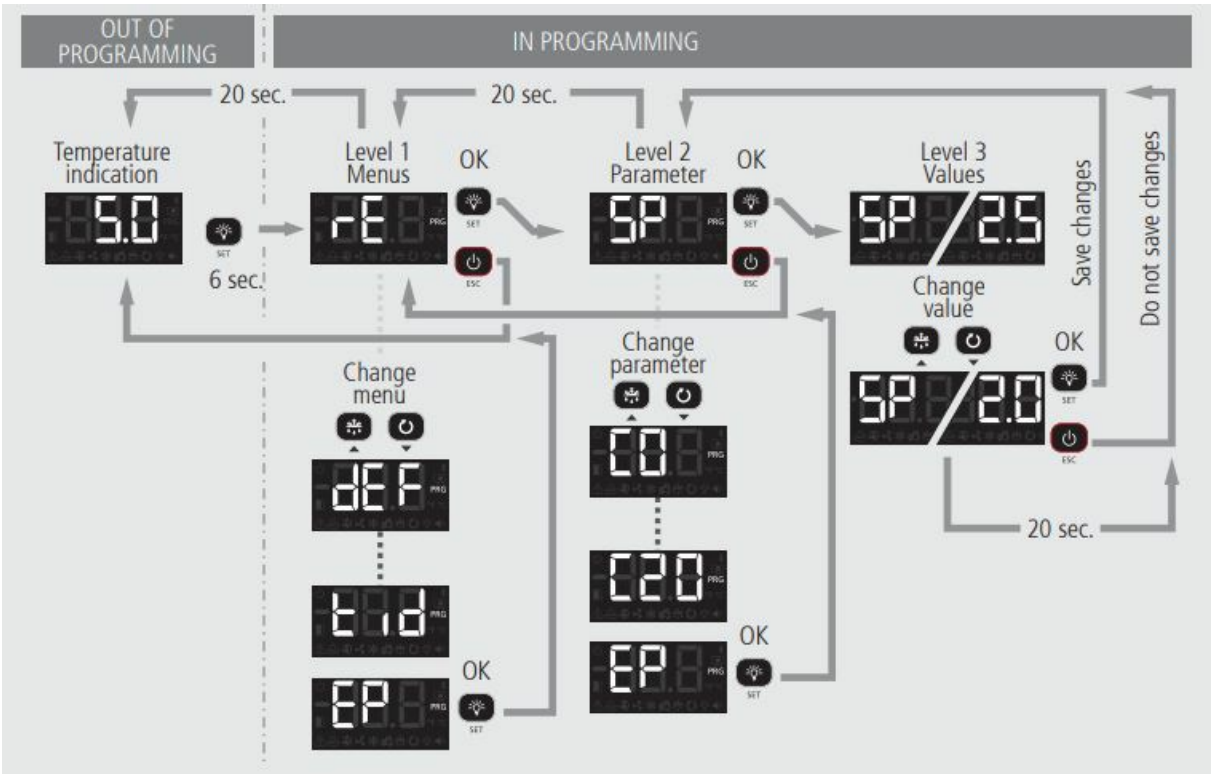
Parameters

Level 2	Description	Value	Min.	Def.	Max.
SP	Temperature setting (Set Point)	°C/°F	-50	0.0	99
CE	SELFDRIVE Mode 0=Deactivated 1= Activated		0	1	1
C1	Probe 1 differential (Hysteresis)	°C/°F	0.1	2.0	20.0
d0	Defrost frequency (Time between 2 starts)		0	6	96
d1	Maximum defrost duration (0=defrost deactivated)		0	*	255
d4	Final defrost temperature (by probe) (If P4 ≠ 1)	°C/°F	-50	8.0	50
F3	Status of the fans during the defrost 0=Shut down; 1=Running		0	0	1
A1	Alarm for maximum in probe 1 (It should be higher than the SP)	°C/°F	A2	99	99
A2	Alarm for minimum in probe 1 (It should be lower than the SP)	°C/°F	-50	-50	A1
d30	Defrost strategy in SELFDRIVE mode		0	5	10

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.
(i) 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 rest of the parameters.

Extended programming menu



Parameters

Regulation and control

Level 1	Level 2	Description	Value	Min.	Def.	Max.
rE	SP	Temperature setting (Set Point)	°C/°F	-50	0.0	99
	CE	SELFDRIVE Mode 0=Deactivated 1= Activated		0	1	1
	C0	Probes 1 & 2 calibration (Offset)	°C/°F	-4.0	0.0	4.0
	C1	Probe 1 differential (Hysteresis)	°C/°F	0.1	2.0	20.0
	C2	Set Point top locking (it cannot be set above this value)	°C/°F	C3	99	99
	C3	Set Point bottom locking (it cannot be set below this value)	°C/°F	-50	-50	C2
	C4	Type of delay for the protection of the compressor: 0=Minimum time of compressor in OFF 1=Minimum time of compressor in OFF and in ON 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 fault in probe 1: 0=OFF; 1=ON; 2=Average according to last 24h prior to probe error 3=ON-OFF according to prog. C7 and C8		0	2	3
	C7	Relay time in ON in the event of probe 1 failure (If C7=0 and C8≠0, the relay will always be disconnected in OFF)	Min.	0	10	120
	C8	Relay time in OFF in the event of probe 1 failure (If C8=0 and C7≠0, the relay will always be connected in ON)	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 ≥ C3). The value of this parameter is always negative, unless it is 0. (0=OFF)	°C/°F	0	-50	C3-SP
	C12	Variation of the Set Point (SP) when the change Set Point function is active. (SP+C12≤ C2) (0= deactivated)	°C/°F	C3-SP	0.0	C2-SP
	C19	Maximum start time from Pump Down (Values between 1 and 9 seconds will not be accepted) (0=deactivated)	Sec.	0	0	120
	C20	Maximum time for pump down (0= deactivated)	Min.	0	0	15
	C21	Probe to be displayed 0=All probes (sequential) 1=Probe 1 (Chamber) 2=Probe 2 (Evaporator) 3=Probe 3 (According to I20) 4=Weighted temperature of the cold room		0	1	3
	C22	Stop fans and compressor on opening door 0=No 1=Yes		0	0	1
	C23	Start-up delay for fans and compressor with door open	Min.	0	0	999
	C24	Delay time of cold stop with door open.	Sec.	0	0	C23
	C25	Influence of probe S3 when regulating with two temperature probes (I20=10)	%	0	0	95
	C27	Probe 3 calibration (Offset)	°C/°F	-4.0	0.0	4.0
	EP	Exit to level 1				

Defrost

Level 1	Level 2	Description	Value	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=Displays the real temperature; 1=Displays the temperature at the start of the defrost; 2=Displays the dEF message		0	2	2
	d3	Maximum duration of the message (Time added at the end of the defrost process)	Min.	0	5	255
	d4	Final defrost temperature (by probe) (If I00 ≠ 1)	°C/°F	-50	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; 3=Reversal of cycle		0	*	3
	d8	Count of time between defrost periods: 0=Total real time 1 =Sum of compressor connected time		0	0	1
	d9	Drip time when completing defrost (Shutdown of compressor 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	Exit to level 1				

Evaporator fans

Level 1	Level 2	Description	Value	Min.	Def.	Max.
dEF	F0	Shutdown temperature of fans	°C/°F	-50	45	50
	F1	Probe 2 differential if fans are shut down	°C/°F	0.1	2.0	20.0
	F2	Shut down fans when the compressor shuts down 0=No 1=Yes		0	0	1
	F3	Status of the fans during the defrost 0=Shut down; 1=Running		0	0	1
	F4	Delay of start-up after defrost (If F3=0) It will only actuate if it is higher than d9	Min.	0	2	99
	EP	Exit to level 1				

Alarms

Level 1	Level 2	Description	Value	Min.	Def.	Max.
AL	A0	Configuration of the temperature alarms 0=Relative to SP 1=Absolute		0	1	1
	A1	Alarm for maximum in probe 1 (It should be higher than the SP)	°C/°F	A2	99	99
	A2	Alarm for minimum in probe 1 (It should be lower than the SP)	°C/°F	-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		0	30	99
	A6	Delay of the external alarm/Severe external alarm on receiving a signal in digital input (I10 or I20 =2 or 3)	Min.	0	0	120
	A7	Delay of external alarm deactivation/Severe external alarm deactivation when the signal in digital input disappears (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	Relay alarm polarity 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)	°C/°F	0.1	1.0	20.0
	A12	Delay of open door alarm (If I10 or I20=1)	Min.	0	10	120
	EP	Exit to level 1				

Basic configuration

Level 1	Level 2	Description	Value	Min.	Def.	Max.
bCn	b00	Delay of all functions on receiving power supply	Min.	0	0	255
	b01	Cold room light timing	Min.	0	0	999
	b10	Function of password 0=Inactive 1=Block access to parameters 2=Block keypad		0	0	2
	PAS	Access code (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	Acoustic alarm enabled 0= No 1=Yes		0	1	1
	b30	Activation of manual calibration 0=Deactivated 1= Activated Requires security code, see page 27		0	0	1
	Unt	Work units 0=°C 1=°F		0	0	1
	EP	Exit to level 1				

Inputs and outputs

Level 1	Level 2	Description	Value	Min.	Def.	Max.
in	i00	Connected probes 1=Probe 1 (Cold room) 2=Probe 1 (Cold room) + Probe 2 (Evaporator)		1	2	2
➔	i 10	Configuration of digital input 1 0= Deactivated 1=Door contact 2=External alarm 3=Severe external alarm 4=Change of SP 5=Remote defrost 6=Defrost block 7= Low pressure switch 8=Remote Stand-by		0	*	8
	i 11	Polarity of the digital input 1 0=Activates on closing contact; 1=Activates on opening contact		0	*	1
	i20	Configuration of digital input 2 0= Deactivated 1=Door contac 2=2=External alarm 3=Severe external alarm 4=Change of SP 5=Remote defrost 6=Defrost block 7=Register probe 8=Probe 2° evaporator ** 9=High pressure switch for Hot Gas 10=2nd cold room temperature probe 11=Product temperature 12=Remote Stand-by		0	0	12
	i2 1	Polarity of the digital input 2 0=Activates on closing contact; 1=Activates on opening contact		0	0	1
➔	o00	Configuration of relay AUX1 0=Deactivated 1=Compressor/Resistor sump 2=Light 3=Virtual control		0	*	3
	o 10	Configuration of relay AUX2 0=Deactivated 1=Alarm 2=Light 3=Virtual control 4=Door frame resistance 5=Defrost 2° evaporator 6=Same as solenoid status 7=Same as unit status 8=Drainage resistor		0	2	8
	EP	Exit to level 1				

Alarm HACCP

Level 1	Level 2	Description	Value	Min.	Def.	Max.
HCP	h 1	Maximum temperature of HACCP alarm	°C/°F	-50	99	99
	h2	Maximum permitted time for activation of the HACCP alarm (0=Disabled)	h.	0	0	255
	EP	Exit to level 1				

Information (Reading only)

Level 1	Level 2	Description	Value	Min.	Def.	Max.
i, d	in i	Option chosen in the configuration wizard				
➔	Pd	Pump down active? 0=No 1=Yesi				
	PU	Programme version				
	Pr	Programme revision				
	bU	Bootloader version				
	br	Bootloader revision				
	PAr	Parameter map revision				
	EP	Exit to level 1				

* According to wizard.

➔ It can only be modified using the configuration wizard (InI).

Technical specifications

Power supply		100 - 240 V~ 50/60 Hz
Maximum input power in the operation		6.3 VA
Maximum nominal current		15 A
Relay AUX 2 - SPDT - 16 A	NO	(EN60730-1: 12 (9) A 250 V~)
	NC	(EN60730-1: 10 (8) A 250 V~)
Relay DEF - SPDT - 20 A	NO	(EN60730-1: 15 (15) A 250 V~)
	NC	(EN60730-1: 15 (13) A 250 V~)
Relay COOL - SPST - 16 A		(EN60730-1: 12 (9) A 250 V~)
Relay FAN - SPST - 16 A		(EN60730-1: 12 (9) A 250 V~)
Relay AUX 1 - SPDT - 20 A	NO	(EN60730-1: 15 (15) A 250 V~)
	NC	(EN60730-1: 15 (13) A 250 V~)
No. of relay operations		EN60730-1:100.000 operations
Probe temperature range		-50.0 °C to 99.9 °C
Resolution, setting and differential		0.1 °C
Thermometric precision		±1 °C
Loading tolerance of the NTC probe at 25 °C		±0.4 °C
Input for NTC probe		AKO-14901
Working ambient temperature		-10 °C to 50 °C
Storage ambient temperature		-30 °C to 60 °C
Protection degree		IP 65
Installation category		II s/ EN 60730-1
Pollution degree		II s/ EN 60730-1

Control device classification: Built-in assembly, with Type 1.B automatic operation action feature, for use in clean situations, logical support (Software) class A and continuous operation. Degree of contamination 2 acc. to UNE-EN 60730-1.

Double isolation between power supply, secondary circuit and relay output.

Temperature during ball-pressure test	Accessible parts	75 °C
	Parts which position active elements	125 °C
Current of radio jamming supression tests		270 mA
Voltage and current as per EMC tests:		207 V, 17 mA
Type of assembly		Fixed internal
MODBUS address		Shown on label
Dimensions		290 mm (W) x 141 mm (H) x 84.4 mm (D)

Internal buzzer

AKO-16525AN

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

Troubleshooting

Errors during calibration

The error message is displayed alternately with the CAL message. The icon flashes.

Error	Description	Solution
E1/E2/E3	Probe error 1 / 2 / 3	Check condition and wiring of affected probe
E10	Evaporator defrost error	Check defrost operation, it must end by temperature (d4)
E20	Idem for E10 but relating to the second evaporator	
E11	Similar temperature in probes S1 and S2	Check position of both probes following recommendations on page 22
E21	Idem for E11 but relating to probe S3	
E12	It has not been possible to carry out the calibration due to a lack of stability in the system	Avoid opening cold room door during calibration. Check main components of the refrigeration circuit, in particular the aspiration part
E22	Idem for E12 but relating to the second evaporator	
E17	Excessive door openings have been detected during calibration and it has not been possible to calibrate.	Avoid opening cold room door during calibration.

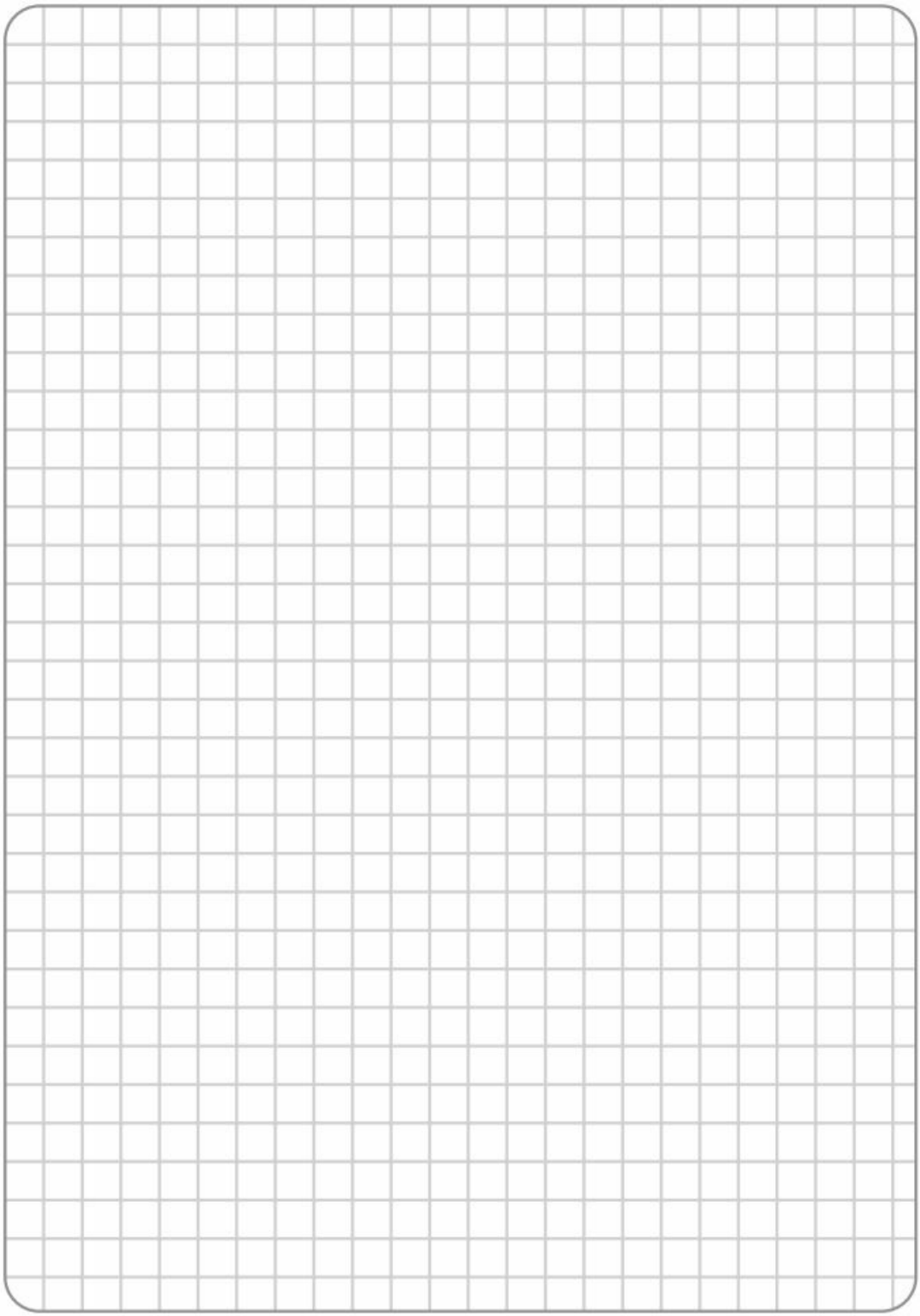
Errors during operation

The error message is displayed alternately with the temperature. The icon flashes.

Error	Description	Solution
E1/E2/E3	Probe error 1 / 2 / 3	Check condition and wiring of affected probe
E13	Similar temperature in probes S1 and S2	Check position of both probes following recommendations on page 22
E23	Idem for E11 but relating to probe S3	
E14	A lack of stability has been detected in the system	Check main components of the refrigeration circuit, in particular the aspiration part
E24	Idem for E14 but relating to the second evaporator	
E15	Persistent lack of system stability has led to deactivation of the SELFDRIVE mode	Check main components of the refrigeration circuit, in particular the aspiration part and the position of probe 2 or 3. To return to the SELFDRIVE mode restart the device
E25	Idem for E15 but relating to the second evaporator	
E16	Configuration has been changed from 1 to 2 evaporators or vice versa.	If the configuration change is correct, start a manual calibration
E18	Excessive door openings have been detected and the device cannot regulate in SELFDRIVE mode.	Check that the door has not been left open or that it does not open more than necessary

Simplified declaration of conformity

AKO Electromecánica S.A.L. hereby declares that the radioelectric device types AKO-16524A and AKO-16525AN (Advanced temperature controller for cold rooms with 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 addres: **http://help.ako.com/manuales/declaracion-ue-de-conformidad**



AKO ELECTROMECÁNICA , S.A.
Avda. Roquetes, 30-38
08812 • Sant Pere de Ribes.
Barcelona • Spain
www.ako.com

Documents / Resources

	AKO 1652H4A11 Temperature Controller [pdf] User Guide 1652H4A11 Temperature Controller, 1652H4A11, Temperature Controller, Controller

References

- AKONET.Cloud
- akonet.cloud help
- Sign in - Google Accounts
- Aide d' akonet.cloud
- User Manual