CE Quick guide

AKO-14545 **AKO-14545-C**

1- Warnings

-If the equipment is used without adhering to the manufacturer's instructions the device safety requirements could be compromised.
-The installation location of the equipment must be protected from vibrations, water and corrosive gases where the ambient temperature does not exceed the value featured in the technical data.
-To ensure a correct reading the probe must be located away from external effects.
-The power circuit should be equipped with a switch for its disconnection of at least 2 A, 230 V, situated near the appliance. The cables will be fed in from the rear and will be types H05VV-F or H05V-K.
-The section to be used will depend on the local standard in force, however must never be less than 1 mm^2.
-The wiring cables for the contact relays must have a section of 2.5 mm^2.
-Make the connection before plugging in the terminals to the equipment (See Fig. A).

ATTENTION: The equipment is not compatible with **AKO-14917** (external communication module) and **AKO-14918** (programming key).

2- Installation

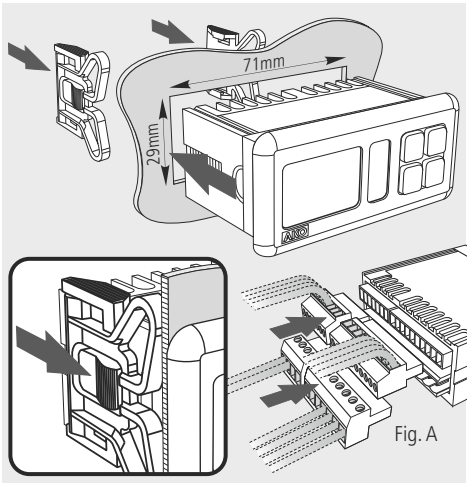


Fig. A

3- Quick start

1 By using keys ▲ and ▼, select the most suitable option according to the installation type in accordance with the table in the "WIZARD" appendix and press **SET**. The wizard **configures the equipment parameters and assigns the input and output functions** according to the installation type chosen.

2 Select the refrigerant gas type used from amongst the following options:
0=R134a **1**=R404a **2**=R717a **3**=R22 **4**=R410a **5**=R507a **6**=R744
7=R407a **8**=R407f **9**=R1234y **10**=R448a **11**=R449a **12**=R450a

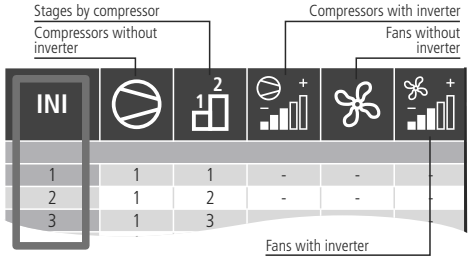
3 Select the primary and secondary display units from amongst the following options:
0=bar-ºC; **1**=psi-ºF; **2**=psi-ºC; **3**=bar-ºF; **4**=ºC-bar; **5**=ºF-psi; **6**=ºC-psi; **7**=ºF-bar

4 Configure the rest of the parameters to their default value? :
0=No, the configuration is kept for all the parameters except for C01, C02, C04, C05 C06, C08 and C09.
1=Yes, all the parameters are configured to their default value (see parameters table)
(This option does not affect parameters C01, C02, C04, C05 C06, C08 and C09)

4- "WIZARD" table

The **"WIZARD"** table in the appendix is divided into 3 groups of columns. The first describes the different installation types (number of compressors and fans, if they have an inverter, etc.) associated with the **INI** option.
The second group specifies the function assigned to each relay depending on the **INI** option selected.
The third group specifies the function assigned to each digital input depending on the **INI** option selected.

Installation type



INI					
1	1	1	-	-	-
2	1	2	-	-	-
3	1	3			

Relay function

Relays R1 to R5

OUTPUTS				
R1	R2	R3	R4	R5
CV	C2	C2a	FV	AL
CV	C2	C2a	C2b	FV
CV	C2	C3	FV	AL

Function assigned to each relay depending on the **INI** option selected*

Input function

Inputs I1 to I6

INPUTS					
I1	I2	I3	I4	I5	I6
T-VAR-C1	T-C2	T-VAR-F	-	L.P.	H.P.
T-VAR-C1	T-C2	T-VAR-F	-	L.P.	H.P.
T-VAR-C1	T-C2	T-C3	T-VAR-F	L.P.	H.P.
T-VAR-C1	T-C2	T-VAR-F	-	L.P.	H.P.

Function assigned to each input depending on the **INI** option selected*

*The meaning of each function is described in the **"WIZARD"** appendix

5- Operation

ESC key

In the programming menu, exit the parameter without saving changes, return to previous level or exit programming.

SET key

By pressing this key for 1 second the probe display units change (according to parameter C09).
Pressing it for 10 seconds accesses the 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.

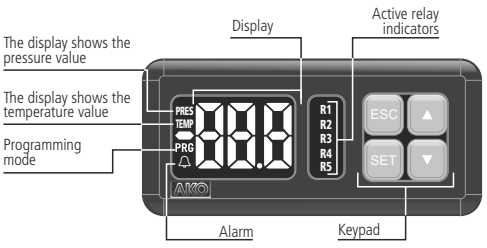
▲ UP key

By pressing this key for 1 second probe 2 is displayed for 5 seconds (or probe 1, according to parameter P02). By pressing a second time the probe ambient temperature value will be shown (only if I07 or I08=3).
In the programming menu it allows scrolling around the different levels, or during the setting of a parameter, changing its value.

▼ DOWN key

Pressing this key returns the equipment to its normal operation after an alarm which require a reset (the causes which triggered the alarm must have disappeared).

In the programming menu it allows scrolling around the different levels, or during the setting of a parameter, changing its value.



6- Operation start-up

Upon being supplied with power the equipment will start up in WIZARD mode (INI / 1 flashing), press ▲ or ▼ to select the most suitable option for the installation type, check the options in the "WIZARD" appendix.

The wizard **configures the equipment parameters and assigns the input and output functions** according to the installation type chosen.

7- Technical specifications

Power supply . . . . . 90-240 V~ 50/60 Hz
Maximum voltage in the SELV circuits . . . . . 20 V
Inputs . . . . . 2 analog inputs + 6 digital inputs
Relays R1 to R4 . . . . . (EN60730-1: 5(4) A 250 V~ SPST)
Relay R5 . . . . . (EN60730-1: 5(4) A 250 V~ SPDT)
No. of relay operations
. . . . . EN60730-1: 100.000 operations
Types of probes . . . . . NTC **AKO-149xx**
. . . . . 4-20 mA
. . . . . 0-5 V ratiometric
Measuring range
NTC . . . . . -50,0 °C to +99,9 °C (-58,0 °F to 211 °F)
4-20 mA / 0-5 V . . . . . -60 to 999
Resolution
NTC . . . . . 0.1 °C (0.1 °F)
4-20 mA / 0-5 V -99.9 to 99.9 . . . . . 0.1
≤ -100 / ≥ 100 1
Working environment . . . . . -10 to 50 °C, moisture <90 %
Storage environment . . . . . -30 to 70 °C, moisture <90 %
Protection degree of the front part IP65
Fixing . . . . . Panel mounting with anchors
Panel cavity dimensions . . . . . 71 x 29 mm
Front part dimensions . . . . . 79 x 38 mm
Depth . . . . . 61 mm
Connections:
. . Terminal to screw for cables with a section of up to 2.5 mm^2
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 power input insulation, secondary circuit and relay output.
Rated pulse voltage . . . . . 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, 17 mA
Radio interference suppression test current . . . . . 270 mA

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

Tel.: +34 902 333 145
Fax: +34 938 934 054
www.ako.com

3514545 22 REV.01 2016

8- Table of parameters and messages

The **Def.** column indicates the ex-works configured default parameters. The pressure values featured on the table are expressed in **bar** and those for temperature in **°C**. If the wizard meanwhile selects another set of units (parameter C09), the equipment will make the conversion automatically.

Read only parameters can only be edited using the INI wizard.

INSTALLATION CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
CnF	C01	Total number of compressors (with or without inverter)		-	-	-
	C02	Number of stages per compressor		-	-	-
	C03	Polarity of the capacity reduction contact **0**=Active when closing the contact; **1**=Active when opening the contact		0	0	1
	C04	Compressor 1 with frequency inverter **0**=No; **1**=Yes		-	-	-
	C05	Total number of fans (1 inverter only is considered with inverter)		-	-	-
	C06	Fan control type **0**=ON/OFF; **1**=Frequency inverter		-	-	-
	C07	Operation type **0**=Direct; **1**=Inverse		0	0	1
	C08	Refrigerant gas type **0**=R134a **1**=R404a **2**=R717a **3**=R22 **4**=R410a **5**=R507a **6**=R744 **7**=R407a **8**=R407f **9**=R1234y **10**=R448a **11**=R449a **12**=R450a		-	-	-
	C09	Display units (Primary-Secondary) **0**=bar-°C **1**=psi-°F **2**=psi-°C **3**=bar-°F **4**=°C-bar **5**=°F-psi **6**=°C-psi **7**=°F-bar		-	-	-
	C10	Frequency inverter output type **0**=4-20 mA; **1**=0-10 V		0	0	1
	InI	This indicates the configuration selected in the wizard (read only)				
	EP	Output to level 1				

EVAPORATION CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
EPr	E01	Pressure / evaporation temperature set point	bar	E03	5	E02
	E02	Evaporation set point upper limit (It cannot be set above this limit)	bar	E03	75	75
	E03	Evaporation set point lower limit (It cannot be set below this limit)	bar	-0.7	-0.7	E02
	E04	Compressor rotation type: **0**=Balancing, depending on the operation time **1**=Sequential (the last in is the first out)		0	0	1
	E05	Compressor control type: **0**=Neutral zone; **1**=Proportional		0	0	1
	E06	Evaporation regulation bandwidth	bar	0.0	2.0	50
	E07	Integral time (PID inverter control)	sec.	2	5	10
	E08	Stop value for pump down (If C07=0)	bar	-0.7	0.1	
	E09	Maximum pump down time (If C07=0) (0= deactivated)	sec.x 10	0	0	255
	EP	Output to level 1				*

CONDENSATION CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
Cnd	F01	Condensation pressure / temperature set point	bar	F03	19	F02
	F02	Condensation set point upper limit (It cannot be set above this limit)	bar	F03	75	75
	F03	Condensation set point lower limit (It cannot be set below this limit)	bar	-0.7	-0.7	F02
	F04	Fan rotation type: **0**=Balancing, depending on the operation time **1**=Sequential (the last in is the first out)		0	1	1
	F05	Fan control type: **0**=Neutral zone; **1**=Proportional		0	0	1
	F06	Condensation regulation bandwidth	bar	0.0	2.0	50
	F07	For fans when the compressors stop **0**=No; **1**=Yes		0	0	1
	F08	Floating condensation **0**=No; **1**=Yes		0	0	1
	F09	Integral time (PID inverter control)	sec.	2	5	10
	F10	Floating condensation minimum set point value **(see remark 1)**	°C	-50	28	99.9
	F11	Condenser temperature delta	°C	6	12	20
	EP	Output to level 1				

PROBE CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
CnP	P01	Probe type selection **0**=4-20 mA; **1**=0-5 V; **2**=NTC		0	0	2
	P02	Probe to be displayed: **0**=Probe 1 (Aspiration) **1**=Probe 2 (Discharge); **2**=Probes 1 and 2 in carousel		0	0	2
	P03	Value 4 mA / 0 V (according to P01) probe 1	bar	-60	-60	999
	P04	Value 20 mA / 5 V (according to P01) probe 1	bar	-60	999	999
	P05	Probe 1 calibration (Offset)	bar	-20	0	20
	P06	Value 4 mA / 0 V (according to P01) probe 2	bar	-60	-60	999
	P07	Value 20 mA / 5 V (according to P01) probe 2	bar	-60	999	999
	P08	Probe 2 calibration (Offset)	bar	-20	0	20
	P09	Calibration of the outside temperature probe for floating condensation	°C	-20	0	20
	EP	Output to level 1				

DIGITAL INPUT CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
Cn I	I01	Polarity digital input 1 (thermal stage 1): **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
	I02	Polarity digital input 2 (thermal stage 2): **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
	I03	Polarity digital input 3 (thermal stage 3): **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
	I04	Polarity digital input 4 (thermal stage 4): **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
	I05	Polarity digital input 5: **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
	I06	Polarity digital input 6: **0**=Activates on closing contact; **1**=Activates on opening contact		0	0	1
	I07	Digital input 5 function: **0**=Low pressure alarm **1**=High pressure alarm **2**=Thermal stage alarm 5 **3**=Ambient temperature probe **4**=External alarm **5**=Remote disconnection ON-OFF **6**=Variation in the aspiration set point (E01) **(see remark 2)**		0	0	6
	I08	Digital input 6 function: **0**=Low pressure alarm **1**=High pressure alarm **2**=Thermal stage alarm 5 **3**=Ambient temperature probe **4**=External alarm **5**=Remote disconnection ON-OFF **6**=Variation in the aspiration set point (E01) **(see remark 2)**		0	1	6
	I09	Turn-on delay time of digital input 5 (not applicable if I07=2)	sec.	0	0	255
	I10	Turn-on delay time of digital input 6 (not applicable if I08=2)	sec.	0	0	255
	I11	Variation in the evaporation set point (new set point= E01+I11) **(see remark 2)**	bar	-20	0	20
	I12	Duration of the variation in the evaporation set point **(see remark 2)**	min.	0	0	255
	EP	Output to level 1				

ENERGY SAVING CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
ES	S01	Start of energy saving - Day of the week: **0**=Deactivated **1**=Monday **2**=Tuesday **3**=Wednesday **4**=Thursday **5**=Friday **6**=Saturday **7**=Sunday **8**=Monday to Sunday **9**=Monday to Saturday **10**=Monday to Friday **11**=Saturday to Sunday		0	0	11
	S02	Start of the energy saving - Hour **(see remark 2)**	h.	0	0	23
	S03	Start of the energy saving - Minute **(see remark 2)**	min.	0	0	59
	S04	Duration of the energy saving **(see remark 2)**	h.	0	0	24
	S05	Variation in the evaporation set point during energy saving (E01+S05) **(see remark 2)**	bar	-20	0	20
		Output to level 1				

TIMING CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
tEP	t01	Minimum operation time for a compressor	sec.x10	1	2	999
	t02	Minimum disconnection time for a compressor **	sec.x10	1	2	999
	t03	Delay time between the compressor start-up/stage and the next one	sec.	1	30	999
	t04	Delay time between the compressor stop/stage and the next one	sec.	1	10	999
	t05	Minimum operation time for a fan	sec.x10	1	1	999
	t06	Minimum disconnection time for a fan	sec.x10	1	1	999
	t07	Delay time between the fan start-up and the next one	sec.	1	2	999
	t08	Delay time between the fan stop and the next one	sec.	1	2	999
	EP	Output to level 1				

CONFIGURATION OF PROTECTIONS AND ALARMS

Level 1	Level 2	Description		Units	Min.	Def.	Max.
AL	A01	Number of active compressor stages with error in probe 1			0	0	***
	A02	Number of active fans or inverter % with error in probe 2	Without inverter		0	C05	C05
			With inverter		0	100%	100%
	A03	Low pressure alarm in probe 1		bar	-0.7	0	75
	A04	Low pressure alarm differential		bar	0.1	1.0	20
	A05	High pressure alarm in probe 2		bar	-0.7	20	75
	A06	High pressure alarm differential		bar	0.1	1.0	20
	A07	Alarm delay after reaching the value		sec.	0	60	999
	A08	Delay of temperature alarms in the start-up.		sec.	0	0	255
	A09	High pressure alarm limit (per digital input) per hour without manual reset. (If I07 or I08=1) (0=deactivated) Once the limit has been exceeded a manual reset will be required for each new alarm.			0	0	255
	EP	Output to level 1					

DATE AND TIME CONFIGURATION

Level 1	Level 2	Description	Units	Min.	Def.	Max.
rtC	r01	Hour		00	00	23
	r02	Minutes		00	00	59
	r03	Day		1	1	31
	r04	Month		1	1	12
	r05	Year		00	15	99
	EP	Output to level 1				

ACCESS AND INFORMATION CONTROL

Level 1	Level 2	Description	Units	Min.	Def.	Max.
t id	P5	Address for units with communication		1	1	255
	L5	Access code (Password)		0	0	999
	PU	Programme version		-	-	-
	Pr	Check		-	-	-
	EP	Output to level 1				

OPERATION TIMES

Level 1	Level 2	Description	Units	Min.	Def.	Max.
tFC	c1	This shows the operation time for the compressor or fan 1	hours x10	-	-	999
	c2	This shows the operation time for the compressor or fan 2	hours x10	-	-	999
	c3	This shows the operation time for the compressor or fan 3	hours x10	-	-	999
	c4	This shows the operation time for the compressor or fan 4	hours x10	-	-	999
	c5	This shows the operation time for the compressor or fan 5	hours x10	-	-	999
	EP	Output to level 1				
EP		Programming output				

* Depending on the compressor control type: Proportional=**E01**; Neutral zone=**E01-E06**.

** If the compressor is equipped with an inverter, this period of time halves.

*** The number of stages depends on the configuration selected in the wizard.

Remark 1: The equivalent value in pressure is calculated depending on the refrigerant gas specified in the wizard.

Remark 2: In the event of the energy saving and the variation in the set point per digital input being activated at the same time, the variation in the set point per digital input will always prevail.

MESSAGES

LS	Access code (Password) request	D	-
PdA	Pump down detained due to time	D	-
Ar	Clock battery dead or clock deprogrammed	D	-
ALL	Low pressure alarm due to probe 1	D	R
ALh	High pressure alarm due to probe 2	D	R
AtI	Thermal alarm 1	D	R
At2	Thermal alarm 2	D	R
At3	Thermal alarm 3	D	R
At4	Thermal alarm 4	D	R
At5	Thermal alarm 5	D	R
AtS	Severe external alarm (input I5 or I6)	D	R
OFF	Remote regulation detained due to digital input (input I5 or I6)	D	-
LPA	Low pressure alarm due to digital input (input I5 or I6)	D	R
hPA	High pressure alarm due to digital input (input I5 or I6)	D	R
E1	Error in probe 1 (open circuit, probe crossed or out of range)	D	R
E2	Error in probe 2 (open circuit, probe crossed or out of range)	D	R
E3	Error in probe 3 (open circuit, probe crossed or out of range)	D	R

D: The message is shown on the display.

R: Alarm relay activated (if available, see WIZARD table).