AKO D14545-C Universal Controller User Guide

D145H4522 Ed. 01

CE **Quick guide**

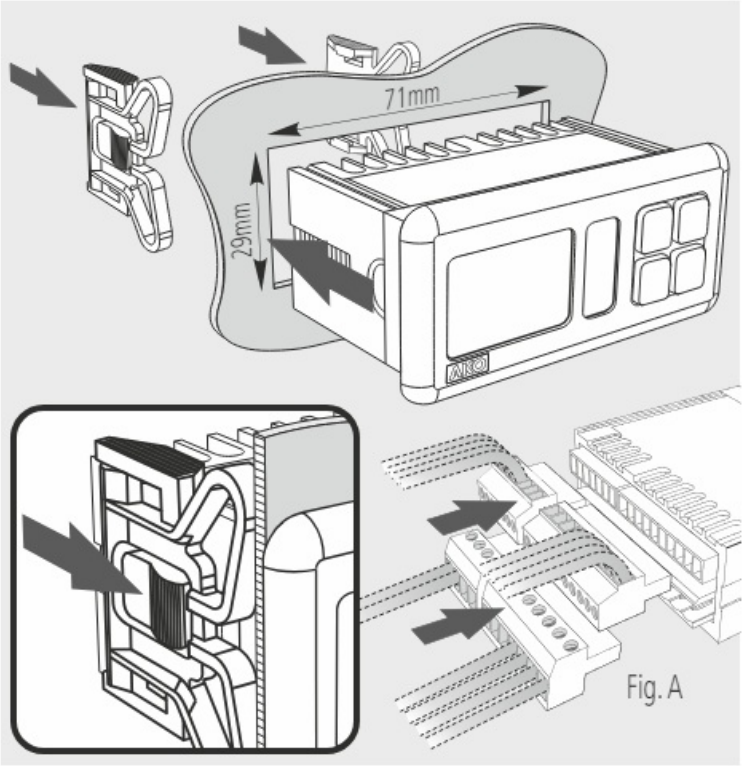
AKO-D14545 AKO-D14545-C

Contents

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 mm².
-The wiring cables for the contact relays must have a section of 2.5 mm².
-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).

Installation



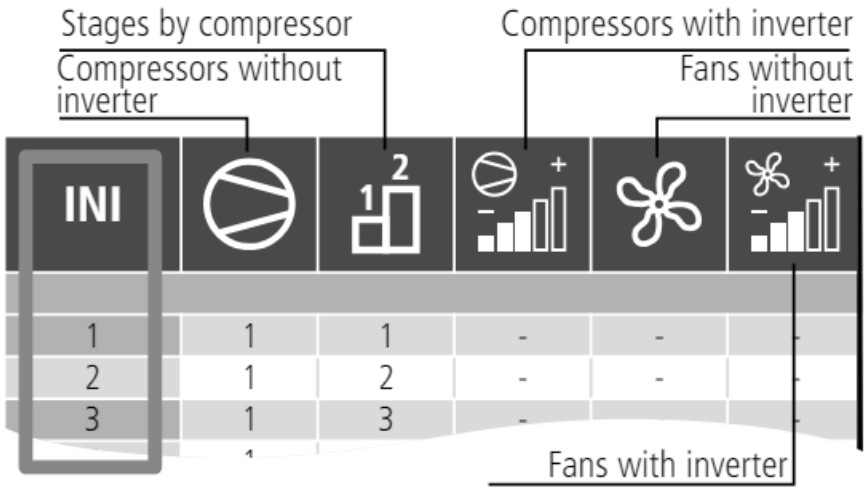
Quick start

	By using keys ▲ and ▼, select the most suitable option according to the installation type i n 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.
	Select the refrigerant gas type used from amongst the following options: 0=R404A 1=R134A 2=R407A 3=R407F 4=R410A 5=R450A 6=R513 7=R744 8=R449A 9=R290 10=R32 11=R448A 12=R1234ze 13=R23 14=R717 15=R407C 16=R1234yf 17=R 22 18=R454C 19=R455A 20=R507A 21=R515B 22=R452A 23=R452b 24=R454A 25=R12 26 =R114 27=R142B 28=R170 29=401A 30=R402A 31=R407B 32=R413A 33=R417A 34=R422A 35 =R422D 36=R427A 37=R438A 38=R500 39=R502 40=R503 41=R600 42=R600A
	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
	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)

“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



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

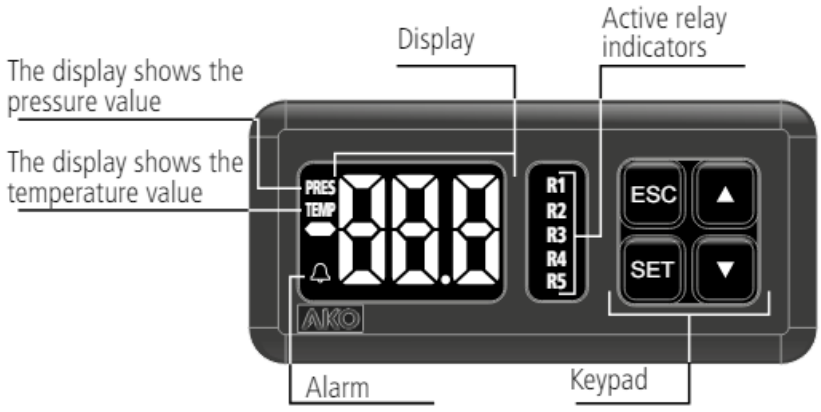
INPUTS					
I1	I2	I3	I4	I5	I6
T-VAR-C1	T-C2	T-VAR-F	-	L.P.	H.P.
T-VAR-C1	T-C2	T-VAR-F	-	L.P.	H.P.
T-VAR-C1	T-C2	T-C3	T-VAR-F	L.P.	H.P.
T-VAR-C1	T-C2	T-VAR-F	-	L.P.	H.P.

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

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

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.

In order to start the wizard again, disconnect the unit's power supply, reconnect it and, during the subsequent 8 seconds, press the key sequence N ▲, ▼**,** SET.

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.

Messages

MESSAGES			
LS	Access code (Password) request	D	–
PdA	Pump down detained due to time	D	–
ALL	Low pressure alarm due to probe 1	D	–
ALH	High pressure alarm due to probe 2	D	R
At 1	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
AES	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 E2 E3	Error in probe 1, 2 or 3 (open circuit, probe crossed or out of range)	D D D	R R R

D: The message is shown on the display.
R: Alarm relay activated (if available, see WIZARD table).

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 ºC. If the wizard meanwhile
selects another set of units (parameter C09), the equipment will make the conversion automatically.

Level 2

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

INSTALLATION CONFIGURATION				

		Description	Units	Min.	Def	Max.
	C01	Total number of compressors (with or without inverter)	bar	–	–	–
	C02	Number of stages per compressor		–	–	–
	C03	Polarity of the capacity reduction contact 0=Active when closing the contact; 1=Active when opening t he 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 invert er)		–	–	–
	C06	Fan control type 0=ON/OFF; 1=Frequency inverter		–	–	–
CnF	C07	Operation type 0=Direct; 1=Inverse		0	0	1
	C08	Refrigerant gas type 0=R404A, 1=R134A, 2=R407A, 3=R407F, 4=R410 A, 5=R450A,6=R513, 7=R744, 8=R449A, 9=R290, 10=R32, 11=R448A, 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, 25=R12, 26=R114, 27=R142B,28=R170, 9=401A, 30=R402A, 31=R407B, 32=R413A, 33=R417A, 34=R422A,35=R422D, 36=R427A, 37=R438A, 38=R500, 39=R502, 40=R503, 41=R600,42=R600A		–	–	–
	C09	Display units (Primary-Secondary), 0=bar-ºC, 1=psi-ºF, 2=psi-ºC, 3=bar-ºF, 4=ºC-bar, 5=ºF-psi, 6 =ºC-psi, 7=ºF-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						
	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	65	65

EPr	E03	Evaporation set point lower limit (It cannot be set below this limit)	bar	-0.7	-0.7	E02
	E04	Tipo 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	2	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.x10	0	0	255
	EP	Output to level 1				
CONDENSATION CONFIGURATION						
	F01	Condensation pressure / temperature set point	bar	F03	14	F02
	F02	Condensation set point upper limit (It cannot be set above this limit)	bar	F03	65	65
	F03	Condensation set point lower limit (It cannot be set below this limit)	bar	-1.4	-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	2	50
End	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)	ºC	-50	28	99.9
	F11	Condenser temperature delta	ºC	6	12	20
	EP	Output to level 1				
PROBE CONFIGURATION						
CnP	P01	Probe type selection 0=4-20 mA; 1=0.5 – 4.5 V; 2=NTC		0	1	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 / 0.5 V (according to P01) probe 1	bar	-60	-1	65
	P04	Value 20 mA / 4.5 V (according to P01) probe 1	bar	-60	9	65
	P05	Probe 1 calibration (Offset)	bar	-20	0	20
	P06	Value 4 mA / 0.5 V (according to P01) probe 2	bar	-60	0	65
	P07	Value 20 mA / 4.5 V (according to P01) probe 2	bar	-60	34	65
	P08	Probe 2 calibration (Offset)	bar	-20	0	20
	P09	Calibration of the outside temperature probe for floating condensation	ºC	-20	0	20
	EP	Output to level 1				

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

* 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.

Level 1						
DIGITAL INPUT CONFIGURATION						
		Description	**Units**	**Min.**	**Def.**	**Max.**
	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
En1	**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		255
	EP	Output to level 1				
TIMING CONFIGURATION						
		Description	**Units**	**Min.**	**Def.**	**Max.**
	t01	Minimum operation time for a compressor	sec. x10	1	2	999
	t02	Minimum disconnection time for a compressor **	sec. x10	1	2	999

tEP	**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

		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	65
	A04	Low pressure alarm differential	bar	0.1	1.0	20
	A05	High pressure alarm in probe 2	bar	-0.7	20	65
	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				

ACCESS AND INFORMATION CONTROL

		Description	**Units**	**Min.**	**Def.**	**Max.**
tid	**b20**	Address for units with communication		1	1	255
	b21	Communication speed: 0:9600 bps; 1:19200 bps; 2:38400 bps; 3:57600 bps		0	0	3
	L5	Access code (Password)		0	0	999
	PU	Programme version		–	–	–
	Pr	Programme revision		–	–	–
	Psr	Programme sub-revision (Information)		–	–	–

OPERATION TIMES

		Description	Units	Min.	Def.	Max.
EFC	**c1**	This shows the operation time for the compressor or fa n 1	h. x10	–	–	999
	c2	This shows the operation time for the compressor or fa n 1	h. x10	–	–	999
	c3	This shows the operation time for the compressor or fa n 1	h. x10	–	–	999
	c4	This shows the operation time for the compressor or fa n 1	h. x10	–	–	999
	c5	This shows the operation time for the compressor or fa n 1	h. x10	–	–	999
	EP	Output to level 1				

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.por entrada digital, prevalecerá siempre la variación del Set Point por entrada digital.
*** The number of stages depends on the configuration selected in the wizard.

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 ºC to +99,9 ºC (-58,0 ºF to 211 ºF)
4-20 mA / 0-5 V ..... -60 to 999
Resolution NTC ..... 0.1 ºC (0.1 ºF)
4-20 mA / 0-5 V -99.9 to 99.9 .....0.1
≤ 100 /≥100 1
Thermometric precision of the equipment (S1/S2) NTC .....± 1 ºC
4-20 mA .....± 1 %
0.5 – 4.5 V .....± 1 %
Working environment ..... -10 a 50 ºC, moisture <90 %
Storage environment ..... -30 a 70 ºC, 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 mm2 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 .....2500V Pressure ball test temperature:
Accessible parts ..... 75 ºC
Parts that position active elements ..... 125 ºC
Voltage and current declared by the EMC tests ..... 207 V, 17 mA

Radio interference suppression test current .....270 mA

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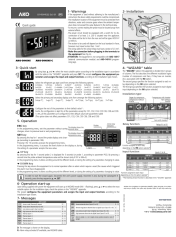
We reserve the right to supply materials that might vary slightly to those described in our Technical Sheets. Updated information is available on our website.

Documents / Resources

	AKO D14545-C Universal Controller [pdf] User Guide D14545-C Universal Controller, D14545-C, Universal Controller, Controller

References

- User Manual