Lots of Options, just One Choice.





ONE CHOICE. OTS OF OPTIONS, JUST





LTR-5

SINGLE OUTPUT ON/OFF OR PID THERMOSTAT OR HUMIDISTAT

Runs on mains power supply \bullet PID with autotuning or ON/OFF control \bullet Output on relay (16A) or SSR piloting \bullet Input for PTC, NTCIOK or $0 \div IV \bullet 0.1 / I^{\circ}C$ or $I^{\circ}F$ resolution \bullet Refrigerating (dehumidifying) or heating (humidifying) control mode selection \bullet Stand-by button on the front \bullet Load start limitation and safety function in the event of breakage of the sensor \bullet Quick setup through ZOT-LTR device \bullet Connection to LAE supervisory systems TAB.

APPLICATIONS:

Temperature: Control of small cold stores, refrigerated cabinets and tables, heating systems, heated cupboards, bainsmarie, ovens, laboratory equipment.

Humidity: Control of greenhouses, seasoning cells, cold rooms, air-conditioned rooms.

			LTR-5 Series				
Functions	LTR-5T	LTR-5C	LTR-5A				
Input type	PTC	NTC10K	0÷1V				
Range	-50÷150°C	-40÷125°C	0÷99.9% r.H.				
	-60÷300°F	-40÷260°F					
Accuracy	$\pm 0.3^{\circ}C^{(a)}; \pm 1.0^{\circ}C^{(c)}$	±0.3°C ^(b) ; ±1°C ^(c)	±0.7% r.H.				
Resolution	0.1/1	°C; °F	0.1/1 % r.H.				
Front protection		IP55					
Panel cut-out		71x29 mm					



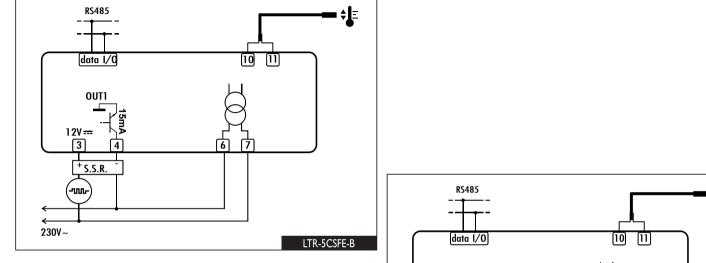
LTR-	5	Т	S	R	E	-B		
		0	2	3	4	5		
POS.	FUNCTION	DESCRIPTION						
0	Input	T = PTC; C = NTC10K; A = 0÷1V						
2	Connectors	S= screw terminals; O= male+female terminals						
3	Output type	R = relay; F = SSR drive						
4	Supply	D =12Vac/dc; E =230Vac; U =115Vac, 2W						
5	Serial comm.	- = no serial port; -A = TTL; -B = RS485						

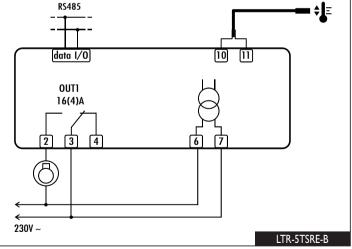
(a) -50÷140°C; (b) -40÷110°C; (c) remaining range.

How to order examples:

LTR-5CSRE-A (NTC10K input, 1 relay, screw terminals, 230Vac supply,TTL port), LTR-5ASRU (0÷1V input, 1 relay, screw terminals, 115Vac supply, no serial port)

On request, the LTR-5 is also available with gasket for a better protection between bezel and panel.





APPLICATIONS

Temperature: Control of small cold stores, refrigerated cabinets and tables, heating systems, heated cupboards, bains-marie, ovens, laboratory equipment.

Humidity: Control of greenhouses, seasoning cells, cold rooms, air-conditioned rooms.

LTR-5 INSTRUCTIONS FOR USE

Thank you for having chosen a LAE electronic product. Before installing the instrument, please read these instructions carefully to ensure maximum performance and safety.

to ensure maximum performance and safety.		CONF	IGURATIOI	N PARAMETERS	OS1 -12.512.5°C Probe T1 offset.
DESCRIPTION	INDICATIONS		o menu is acce	ADR 1255 LTR-5 address for PI	
000° x5	DUT1 Thermostat output	Press	button 🖨 to	▲ select the parameter to be modified. display the value.	
HILL		 Wher 	n button 😫 is		
#lae		To ex	it from the set	rup, press button 🗵 or wait for 30 seconds.	WIRING DIAGRAMS
		PAR	RANGE	DESCRIPTION	π. Γ
Fig.1 — Front panel		SCL	1°C; 2°C;	Readout scale. 1°C : measuring range -50/-19.9 99.9/150°C for LTR-5T	
Setpoint button.	Increase button.		°F	-40/-19.9 99.9/125°C for LTR-5C 0.0 99.9 %r.H. for LTR-5A	
Decrease button.	¥ⓓ Exit / Stand-by button.			2°C : measuring range -50 150°C for LTR-5T -40 125°C for LTR-5C 00 99 %r.H. for LTR-5A	OUT1 12(4)A
 Insert the controller through a hole measuring 71x29 mm. 				°F: measuring range -60 300° F or LTR-5T -40 250° F for LTR-5C	
 Make sure that electrical connections comply with the paragrap disturbance, keep the sensor and signal cables well separate from 				Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to re-configure the parameters relevant to the	
 Fix the controller to the panel by means of the suitable clips, adheres to the panel perfectly, in order to prevent debris and mo 	by pressingly gently; if fitted, check that the rubber gasket	SPL	-50SPH	absolute and relative temperatures (SPL, SPH, 1SP, 1HY, etc). Minimum limit for 1SP setting	230V~
 Place the probe T1 inside the room in a point that truly represe 		SPH	SPL.150°	Maximum limit for 1SP setting	
OPERATION		1SP	SPL SPH	Setpoint (value to be maintained in the room).	
DISPLAY During normal operation, the display shows either the temperatu	ure measured or one of the following indications:		HY/PID	Control mode.	- R5485
OFF Controller in stand-by	E1 In tuning: timeout1 error	1Y		With 1Y=HY you select control with hysteresis: parameters 1HY and 1CT are used. With 1Y=HID you select a Proportional-Integral-Derivative control mode: parameters 1PB, 1IT, 1DT, 1AR, 1CT will	(data 1/0) (10
OR Probe T1 overrange or failure TUN / 5.4 Controller in autotuning	E2In tuning: timeout2 errorE3In tuning: overrange error			be used.	
SETPOINT (display and modification of desired temperatu	ıre value)	1HY	-19.919.9°C	Thermostat differential [control with hysteresis]. Set 1HY on a value greater than zero to make the output work in refrigerating mode, vice versa set on a value lower	12V == 3 4 6 7
 press button € for at least half second, to display the setpoint By keeping button € pressed, use button ♥ or ▲ to set the d 				than zero to make the output work in heating mode. With 1HY =0 the output is always off.	*SSR.
maximum SPH limit). ■ When button ④ is released, the new value is stored.					
STAND-BY					230V ~
Button \square , when pressed for 3 seconds, allows the controller to SB =YES only).	be put on a standby or output control to be resumed (with			1SP 1SP+1HY T[°] 1SP-1HY 1SP T[°] Fig. 1a. ON/OFF refrigerating control (1Y=HY, 1HY>0) Fig. 1b. ON/OFF heating control (1Y=HY, 1HY<0)	
		1PB	-19.919.9°C	Proportional band [PID control]. Set 1PB on a value greater than zero to make the output work	
CONTROLLER AUTOTUNING IN PID MODE Before starting				in refrigerating mode, vice versa set on a value lower than zero to make the output work in heating mode. With 1PR =0	
 Adjust the setpoint 1SP to the desired value. Set 1Y=PID. 				the output is always off.	
Make sure that the 1PB value matches the desired control model.	de (1PB <0 for heating; 1PB >0 for refrigeration).			With a proportional controller, the temperature is controlled by varying the time of activation of the output. The nearer the Process	
Start autotuning ■ Keep buttons ▼ + ▲ pressed for 3 seconds. 1CT blinks on th	he display.			temperature to set point, the less time of activation. A small proportional band increases the promptness of response of the system to temperature variations, but tends to make	
 With € + ▼ or ▲ set the cycle time in order to define the c To start autotuning press ▼ + ▲ or wait for 30 seconds. To a 				it less stable. A purely proportional control stabilises the temperature within the proportional band but does not cancel	
During autotuning	5 <u>–</u>			the deviation from the set point.	
 During the entire autotuning phase, the display alternates in the second power failure, when power is resumed, after the iterational second power failure. 	•	1IT	0999s	Integral action time [PID control].	
function. To abort the autotuning, without modifying the previous contr				The steady-state error is cancelled by inserting an integral action into the control system. The integral action	
 After the autotuning has taken place successfully, the controlle 				time, determines the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With	
Errors				temperature is achieved, but a high speed (III low) may be the cause of overshoot and instability in the response. With IIT=0 the integral control is disabled. Process temperature Process temperature	
 If the autotuning function failed, the display shows an error co- E1 timeout1 error: the controller could not bring the temperature 	ature within the proportional band. Increase 1SP in case of			Time	
heating control, vice versa, decrease 1SP in case of refrigerating E 2 timeout2 error: the autotuning has not ended within the max	•	1DT	0999s	Derivative action time [PID control].	
 process and set a longer cycle time 1CT. E3 temperature overrange: check that the error was not caused 	by a probe malfunction, then decrease 1SP in case of heating			Response overshoot in a system controlled by a Proportional-	
control, vice versa increase 1SP in case of refrigerating control a To eliminate the error indication and return to the normal mod				action in the control A high derivative action (1DT high)	
Control improvement				makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled.	
 To reduce overshoot, reduce the integral action reset 1AR. To increase the response speed of the system, reduce the prop 	ortional band 1PB. Caution: doing this makes the system less				
stable. To reduce swings in steady-state temperature, increase the				Time	
 although its response speed is decreased. To increase the speed of response to the variations in tempera 		1AR	0100%	Reset of integral action time referred to 1PB [PID control].	
 To increase the speed of response to the variations in tempera value makes the system sensitive to small variations and it may be 				Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT).	
RECALIBRATION		1CT	0255s	Cycle time.	
 Have a precision reference thermometer or a calibrator to hand Ensure that OS1=0 and SIM=0. 	u.			In the ON/OFF control (1Y =HY), after the output has switched on or off, it will remain in the new state for a minimum time of 1CT seconds, regardless of the temperature value. In the PID control (1Y =PID), the cycle time is the period of time in which the output completes a cycle (Time ON +	
 Switch the controller off then on again. During the auto-test phase, press buttons X + ▼, and keep t 				In the PID control (1Y=PID), the cycle time is the period of time in which the output completes a cycle (1 ime UN + Time OFF). The faster the system to be controlled reacts to temperature changes, the smaller the cycle time should be, in order to obtain a greater temperature stability and less sensitivity to load variations.	
With buttons and select OAD or SAD: OAD allows a c scale of measurement. SAD allows a calibration of the top pa		105		Output state in case of probe failure.	
between the calibration point and 0.		1PF	ON/OFF	טעייני גימיב זו נמצב טו אוטשר ומוועוב.	

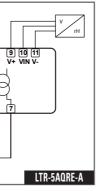
reference instrument.

■ Exit from calibration by pressing button 🗵 .

■ Press 🕏 to display the value and then use 🔄 + 💌 or 🔺 to make the read value coincide with the value measured by the

BAU	NON / SBY	With BAU =SBY, the
SIM	0100	Display slowdown.
0S1	-12.512.5°C	Probe T1 offset.
ADR	1255	LTR-5 address for PC

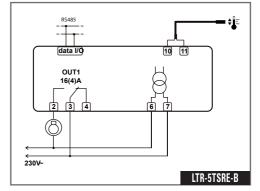
C communication.



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LTR-5CSFE-B

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TECHNICAL DATA

Power supply

LTR-5D	12Vac/dc±10%,2W
LTR-5E	230Vac±10%, 50/60Hz, 2W
LTR-5U	115Vac±10%, 50/60Hz, 2W

Relay outputs (LTR-5..R..) LTR-5.**S**R.. OUT1 16(4)A LTR-5.**Q**R.. OUT1 12(4)A

SSR drive (LTR-5..F..)

OUT1 15mA 12Vdc

Inputs	
LTR-5A:	0-1V
LTR-5C:	NTC 10KΩ@25°C, part No. LAE SN4
LTR-5T:	PTC 1000Ω@25°C, part No. LAE ST1

 Measuring Range

 LTR-5A...:
 0...99%r.H.

 LTR-5C...:
 -40...125°C

 LTR-5T...:
 -50...150°C

Measuring accuracy

LTR-5A:	<±0.7%r.H. in the measuring range
LTR-5C:	$<\pm 0.3^{\circ}C$ -40100°C; $\pm 1^{\circ}C$ out of that range
LTR-5T:	$<\pm0.3^{\circ}C$ -50140°C; $\pm1^{\circ}C$ out of that range

Operating conditions -10 ... +50°C; 15...80% r.H.

CE (Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front protection IP55

VIA PADOVA, 25 31046 ODERZO /TV /ITALY TEL. +39 - 0422 815320 FAX +39 - 0422 814073 www.lae-electronic.com E-mail: sales@lae-electronic.com

Two channel universal Controller, ON/OFF OR PID

Runs on mains power supply • PID with autotuning or ON/OFF control • Main output on 12A relay or for SSR-piloting and auxiliary output on 5A relay \bullet Input for 0÷ IV, 0/4÷20mA, PTC/NTCIOK, TC J/K or Pt100 \bullet 0.1 / 1°C or 1°F resolution • Selectable Refrigerating/Heating (Dehumidifying/Humidifying) control • Absolute or relative temperature alarms • ON/OFF button on front • Load start limitation and safety operation in case of probe failure • Quick programming through ZOT-ACI key • Connection to LAE TAB supervisory systems

APPLICATIONS:

Temperature: Control of small cold stores, refrigerated cabinets and tables, heating systems, heated cupboards, bains-marie, ovens, laboratory equipment.

Humidity: Control of greenhouses, seasoning cells, cold rooms, air-conditioned rooms.



AC1-5		Т	S	1	R	W	-В			
1 2 3 4 5										
POS.	FUNCTION	DESCRIPTION								
0	Input	A = 0÷1V;	$\mathbf{A} = 0 \div 1V$; $\mathbf{I} = 0/4 \div 20 \text{mA}$; $\mathbf{J} = \text{TC} 'J' / 'K'$; $\mathbf{P} = \text{Pt100}$; $\mathbf{T} = \text{PTC} / \text{NTC10K}$							
2	Connections		S = built-in screw terminals							
3	Output No.	1 = one; 2 = two								
4	Output type	R	R = relay; M = Out1 on SSR, Out2 on relay							
5	Supply	D * = 12Vac/dc; W = 115230Vac 50/60Hz; 3 W								
6	Serial comm.		Ni	il = no; -A = T	TL ; -B = RS48	15				

* = in the version with 12Vac/dc power supply, the maximum voltage on the outputs is 50Vac/dc, in order to ensure safety insulations.

						AC1	5 Serie
Functions	AC1-5T		AC1-5P	AC1-5J		AC1-5A	AC1-5I
Input type	PTC	NTC10K	Pt100	TC "J"	TC "K"	0÷1V	0/4÷20m/
Range	-50÷150°C -60÷300°F	-40÷125°C -40÷260°F	-100÷850°C -150÷999°F	-50÷750°C -50÷999°C (-60÷999°F -60÷999°F		Configurable in setup	
Accuracy	±0.3°C	±0.3°C	±0.3°C ^(a) ; ±1°C ^(b)	±3°C		±3mV	±0.2mA
Resolution		D.1/1°C/1°	F	1 °C	C / °F	0.1/	1

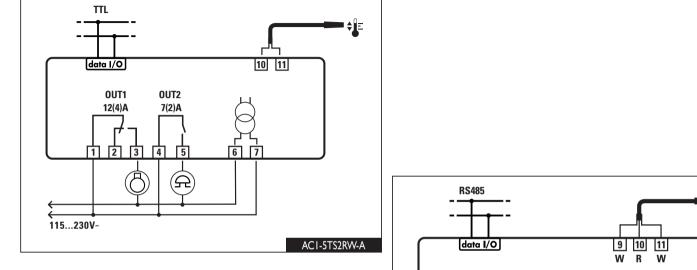
(a) -50÷150°C; (b) remaining range.

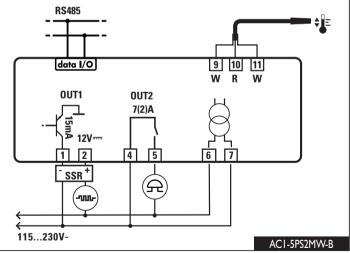
How to order:

ACI-5TS2RW-A (PTC/NTCI0K input, screw terminals, 2 relays, 115÷230Vac supply voltage, TTL port) ACI-5AS2MD-B (0+1V input, screw terminals, output 1 on SSR drive, output 2 on relay, 12Vac/dc supply voltage, RS485 port)

On request, the ACI-5 is also available with gasket for a better protection between bezel and panel.

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Temperature: Control of small cold stores, refrigerated cabinets and tables, heating systems, heated cupboards, bains-marie, ovens, laboratory equipment.

Humidity: Control of greenhouses, seasoning cells, cold rooms, air-conditioned rooms.

PID system

		 Exit from c 	alibration by pre	ssing button 🕱.	2CH	REE. HEV	Refrigerating control (PEE) or bor	ting control mode (HEA) for the our	iliary output
AC1-5 INSTRUCTION				PARAMETERS	2CH 2HY		REF; HEA Refrigerating control (REF) or heating control mode (HEA) for the auxiliary output. 019.9° Differential of thermostat 2. With 2HY= 0 the auxiliary output always remains off.		
Thank you for having chosen a LAE electronic product. Before installing th to ensure maximum performance and safety. DESCRIPTION	e instrument, please read these instructions carefully	 With buttor 	▼ or ▲ sele	the teter configuration menu, press button 🕱 + 👔 for 5 seconds.	2T0 ₩L= ₩0 2T1		Minimum off time. After output 2 has been turned off,	it remains inactive for 2T0 minutes re	
	ut1 Channel 1 output	 By keeping When butto 	n i is release	sed, use button $\overline{\mathbf{v}}$ or \mathbf{k} to set the desired value. d, the newly programmed value is stored and the following parameter is displayed.	Й УО 2T1	030min	value measured. Minimum on time. After output 2 has been turned on	it remains active for 2T1 minutes rea	ardless of the temperature
0072	JT2 Channel 2 output			ss button 🕱 or wait for 30 seconds.	2PF	ON/OFF	value measured. Auxiliary output state in case of pr		,
		PAR SCL	RANGE 1°C;	DESCRIPTION Readout scale (see table of input specifications)	ATM	NON;	Alarm threshold management.		
	Alarm	JUL	2°C; °F	Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to reconfigure the parameters relevant to the absolute and relative temperatures (SPL, SPH, 1SP, 1HY etc)		ABS; REL	ABS: the values programmed in A	hibited (<i>the following parameter will</i> LA and AHA represent the real alarm R and AHR are alarm differentials refer	n thresholds.
Fig.1 - Front panel i Info / Enter button	Increase / Modify Setpoint 2 button	SPL	-50°SPH	Minimum limit for 1SP setting					
Modify Setpoint 1 / Decrease button		SPH 1SP	SPL150° SPL SPH	Maximum limit for 1SP setting. Setpoint (value to be maintained in the room).	_		OFF	T[°]	T[°]
INSTALLATION		15P	HY; PID	Control mode.	_		1SP-ALR 1SP 1SP+1H	135-111-4	LR 1SP 1SP+AHR
 Insert the controller through a hole measuring 71x29 mm; Make sure that electrical connections comply with the paragraph "wirin 	a diagrams". To reduce the effects of electromagnetic			With 1CM=HY you select control with hysteresis: parameters 1HY, 1T0 and 1T1 are used. With 1CM=PID you select a Proportional-Integral-Derivative control mode: parameters 1PB, 1IT			Temperature alarm with relative refrigerating control (ATM=REL		with relative thresholds, TM =REL, 1CH =HEA).
disturbance, keep the sensor and signal cables well separate from the pow Fix the controller to the panel by means of the suitable clips, by pressing	ver wires.			1DT, 1AR, 1CT will be used	, ທີ່ ALA	-50°AHA	Low temperature alarm threshold.		
 The the controller is parted by means of the safety copy, by pressing to the panel perfectly, in order to prevent debris and moisture infiltration to ATTENTION: during the setup of the controller, please make sure that the 	the back of the instrument.	1CH	REF; HEA 019.9°	Refrigerating (REF) or Heating (HEA) control mode. OFF/ON thermostat differential. With 1HY= 0 the output is always off.		ALA 150°	High temperature alarm threshold		
in the table "input specifications".	•		019.9		₹ AHA	_			
 Place the probe T1 inside the room in a point that truly represents the te OPERATION 	mperature of the stored product.					-12.00°	Low temperature alarm differentia With ALR=0 the low temperature		
DISPLAY				OFF	AHR	012.0°	High temperature alarm differentia With AHR= 0 the high temperature		
During normal operation, the display shows either the temperature measur		XH=N		ON/OFF refrigerating control ON/OFF heating control	ATD	0120min	Delay before alarm temperature		
OR Probe T1 overrange or failure E1 I	Controller in autotuning n tuning: timeout1 error	1T0	030min	(1CM=HY, 1CH=REF) (1CM=HY, 1CH=HEA) Minimum off time.	SB	NO/YES	Stand-by button enabling.		
HI Room high temperature alarm E2 I	n tuning: timeout2 error n tuning: overrange error			After output 1 has been turned off, it remains inactive for 1T0 minutes regardless of th temperature value measured.	e INP	0mA/4mA, T1/T2	Sensor input selection (see table	of input specifications).	
MENU INFO		1T1	030min	Minimum on time. (<i>the following parameter will be 1PF</i>).	-	ST1/SN4	In the models AC1-5A, AC1-5J.	· · · · · · · · · · · · · · · · · · ·	
The information available in this menu is:				After output 1 has been turned on, it remains active for 1T1 minutes regardless of the temperatur value measured.	RLO	-19.9RHI	Minimum range value (<i>in the mod</i> RLO takes the minimum value me	els AC1-5A, AC1-5I only) easured by the transmitter (i.e. the va	alue matching 0V, 0/4mA)
THI Maximum temperature recorded LOC H TLO Minimum temperature recorded H	Keypad state lock	1PB	019.9°	Proportional bandwidth.	RHI	RLO99.9	Maximum range value (in the mod	dels AC1-5A, AC1-5I only)	
Access to menu and information displayed.			1	Temperature control takes place by changing the	OS1	-12.512.5°	RHI takes the maximum value me Probe T1 offset.	easured by the transmitter (i.e. the va	alue matching 1V, 20mA)
 Press and immediately release button 1. With button 7 a select the data to be displayed. 				ON time of the output: the closer the temperature to the setpoint, the less time of activation. A small	TLD	130min		FLO) and maximum temperature (TF	II) logging.
 Press button 1 to display value. To exit from the menu, press button or wait for 10 seconds. 				proportional band increases the promptness of response of the system to temperature variations,	SIM	0100	Display slowdown		,
Reset of THI, TLO recordings ■ With button ♥ or ▲ select the data to be reset.				but tends to make it less stable. A purely proportional control stabilises the temperature	ADR	1255	AC1-5 address for PC communication	ation	
 Display the value with button (i). While keeping button (i) pressed, use button (i). 				within the proportional band but does not cancel					
CHANNEL 1 SETPOINT (display and modification of desired tem	iperature value)			the deviation from setpoint. Time With 1PB=0 the output is always off.	INPUTS	PECIFICA	TIONS		
 Press and release button II: the LED L1 blinks, the display shows 1SP f Press buttons T or to set the desired value (adjustment is within the min 		1IT	0999s	Integral action time.	MODEL	INPU		RANGE [MEASUREMENT ACCUP	RACY]
 To store the new value press button (), or wait for 10 seconds. To go back to normal mode without saving the new value, press (). 				The steady-state error is cancelled by inserting an integral action. The integral action time, determines			SCL=1°C	SCL=2°C	SCL=°F
 CHANNEL 2 SETPOINT With the auxiliary output set as thermostat control (OAU=THR), it's post 	sible to modify setpoint 2 during the normal operation			the speed with which the steady-state temperature	AC1-5A	0÷1		O+RHI [< ± 3mV]	
 of the controller. Press and release button (L2): the LED L2 blinks, the display shows 23 		물		cause of overshoot and instability in the response.	AC1-5I	INP = 0mA	0÷20mA RLC	0+RHI [< ± 0.2mA]	
(2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a thresh associated to the parameter appears.		CM		With 1IT =0 the integral control is disabled.		INP=T1	TC "J"	-50÷750°C [< ±3°C]	
 Press buttons (a) or (b) to set the desired value. To store the new value press button (b) or wait for 10 seconds. 		1DT	0999s	Time	AC1-5J	INP=T2	TC "K"	-50÷999°C [< ±3°C]	-60÷999°F [< ±5°F]
To go back to normal mode without saving the new value, press X.				Derivative action time.		INF=12			
OTAND DV					AC1-5P	PT1	-50/-19.9÷99.9/150		-150÷999°F [<+2°F(-60÷999°) +4°F]
STAND-BY Button (2), when pressed for 3 seconds, allows the controller to be put on a stan	dby or output control to be resumed (with SB =YES onlv).			Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT	AC1-5P	PT1	50/ 10 0÷00 0/150	[<±1°C(-50÷850°), ±2°C]	
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK				Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is dischold	AC1-5P	PT1	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω -50/-19.9 ÷ 99.9/15 [<±0.3°C(-30+130°),±	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C]	[<±2°F(-60÷999°), ±4°F] -60÷300°F [<±0.6°F(-20÷260°),±2°F]
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whic in a public place. In the INFO menu, set parameter LOC =YES to inhibit al	h might be attempted when the controllers is operating			Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With		PT1	00 -50/-19.9+99.9/150 [<±0.3°C]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C]	[<±2°F(-60÷999°), ±4°F] -60÷300°F [<±0.6°F(-20÷260°),±2°F] -40÷260°F
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whic	h might be attempted when the controllers is operating			Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled.	AC1-5T	PT1	00 -50/-19.9+99.9/150 [<±0.3°C]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30÷130°), ±1°C] 5°C -40 ÷ 125°C	[<±2°F(-60÷999°), ±4°F] -60÷300°F [<±0.6°F(-20÷260°),±2°F] -40÷260°F
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whic in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC= NO.	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation	1AR	0100%	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th	AC1-5T	PT11 INP=ST1 INP=SN4 DIAGRAM	00 -50/-19.9+99.9/150 [<±0.3°C]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C]	[<±2°F(-60÷999°), ±4°F] -60÷300°F [<±0.6°F(-20÷260°),±2°F] -40÷260°F
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whic in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode		0100%	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB	AC1-5T WIRING	PT1	00 -50/-19.9+99.9/150 [<±0.3°C]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30÷130°), ±1°C] 5°C -40 ÷ 125°C	[<±2°F(-60÷999°), ±4°F] -60÷300°F [<±0.6°F(-20÷260°),±2°F] -40÷260°F
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make (1CH=REF for refrigerating control, 1CH=HEA for heating control); then ad Start autotuning During normal operation, keep buttons (i) + (v) pressed for 3 seconds. 1C ²	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. I blinks on the display. With () + () or () set the cycle	1AR 1CT		Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle	AC1-5T	PT11 INP=ST1	00 -50/-19.9+99.9/150 [< ±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) (±0.3°C(-30+130°),± -50/-19.9 + 99.9/12 (LAE SN4) (±0.3°C(-40+100°),± -50/-19.9 + 99.9/12 (±0.3°C(-40+100°),± -50/-19.9 + 99.9/12 (±0.3°C(-40+100°),± -50/-19.9 + 99.9/15 (LAE SN4) 9 10 [1]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C]	[<±2°F(-60÷999°), ±4°F] -60÷300°F [<±0.6°F(-20÷260°),±2°F] -40÷260°F
Button (b), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM =PID; make (1CH =REF for refrigerating control, 1CH =HEA for heating control); then ad Start autotuning During normal operation, keep buttons (i) + (i) pressed for 3 seconds. 1CT time in order to define the dynamic of the process to be controlled. To abo press (i) + (i) or wait for 30 seconds.	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. I blinks on the display. With () + () or () set the cycle	1CT	0100% 1255s	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations.	AC1-5T	PT11 INP=ST1	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω -40/-19.9 + 99.9/15 (LAE SN4) IS IS IS IS IS IS IS IS IS IS	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C]	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make (1CH=REF for refrigerating control, 1CH=HEA for heating control); then ad Start autotuning During normal operation, keep buttons () + () pressed for 3 seconds. 1C ⁻ time in order to define the dynamic of the process to be controlled. To abo press () + () or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the a	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. T blinks on the display. With (i) + ♥ or ▲ set the cycle rt the autotuning function, press இ; to start autotuning ctual temperature measured. In case of power failure,	1CT 1PF	0100% 1255s ON/OFF	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure.	AC1-5T		00 -50/-19.9+99.9/150 [< ±0.3°C] PTC 1000 Ω -50/-19.9 + 99.9/15 (LAE ST1) [<±0.3°C(-30+130°),± NTC 10K Ω -40/-19.9 + 99.9/12 (LAE SN4) [<±0.3°C(-40+100°),± IS	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C]	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM =PID; make (1CH =REF for refrigerating control, 1CH =HEA for heating control); then ad Start autotuning During normal operation, keep buttons () + () pressed for 3 seconds. 1CT time in order to define the dynamic of the process to be controlled. To above press () + () or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the a when power is resumed, after the initial autotest phase, the controller resi- without modifying the previous control parameters, keep button () pressed	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. I blinks on the display. With (1) + (1) or (▲) set the cycle rt the autotuning function, press (3); to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, ed for 3 seconds. After the autotuning has taken place	1CT	0100% 1255s ON/OFF NON; THR;	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle remacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM)	AC1-5T	PT11 INP=ST1 I INP=SN4 DIAGRAM R5485 data I/0 UT1 OUT2 (4)A 7(2)A 7 (2)A 7 (2)A 7 (2)A	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω 40/-19.9 + 99.9/12 [<±0.3°C(-30+130°),± 40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS 0 10 11 V + V _M V- 6 [7]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C]	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button ()), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make (1CH=REF for refrigerating control, 1CH=HEA for heating control); then ad Start autotuning During normal operation, keep buttons () + () pressed for 3 seconds. 1C ⁺ time in order to define the dynamic of the process to be controlled. To above press () + () or wait for 30 seconds. During tuotuning During the entire autotuning phase, the display alternates TUN with the a when power is resumed, after the initial autotest phase, the controller resu	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. I blinks on the display. With (1) + (1) or (▲) set the cycle rt the autotuning function, press (3); to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, ed for 3 seconds. After the autotuning has taken place	1CT 1PF	0100% 1255s ON/OFF NON;	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL0: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM).	AC1-5T	PT11 INP=ST1 I INP=SN4 I DIAGRAM	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω 40/-19.9 + 99.9/12 [<±0.3°C(-30+130°),± 40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS 0 10 11 V + V _M V- 6 [7]	[<±1°C(-50+850°), ±2°C]	[<±2°F(-60÷999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (●), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM =PID; make (1CH =REF for refrigerating control, 1CH =HEA for heating control); then ad Start autotuning During normal operation, keep buttons ① + ⑦ pressed for 3 seconds. 1C ¹ time in order to define the dynamic of the process to be controlled. To above press ⑦ + ④ or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the as when power is resumed, after the initial autotest phase, the controller ress without modifying the previous control parameters, keep button ③ presses successfully, the controller updates the control parameters and start to com-	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. T blinks on the display. With ① + ⑦ or ④ set the cycle rt the autotuning function, press ⑧; to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, ed for 3 seconds. After the autotuning has taken place trol.	1CT 1PF OAU	0100% 1255s ON/OFF NON; THR; AL0;	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> 2SM).	AC1-5T	PT11 INP=ST1 I INP=SN4 DIAGRAM R5485 data I/0 UT1 OUT2 (4)A 7(2)A 7 (2)A 7 (2)A 7 (2)A	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω 40/-19.9 + 99.9/12 [<±0.3°C(-30+130°),± 40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS 0 10 11 V + V _M V- 6 [7]	[<±1°C(-50+850°), ±2°C]	[<±2°F(-60÷999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (●), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM =PID; make (1CH =REF for refrigerating control, 1CH =HEA for heating control); then ad Start autotuning During normal operation, keep buttons ① + ⑦ pressed for 3 seconds. 1CT time in order to define the dynamic of the process to be controlled. To abo press ⑦ + ④ or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the a when power is resumed, after the initial autotest phase, the controller ress without modifying the previous control parameters, keep button ⑦ presses successfully, the controller updates the control parameters and start to cont Errors If the autotuning function failed, the display shows an error code: ■ E1 timeout1 error: the controller could not bring the temperature within 1 control, vice versa, decrease 1SP in case of refrigerating control and re-star	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. I blinks on the display. With () + () or () set the cycle rt the autotuning function, press (); to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, d for 3 seconds. After the autotuning has taken place trol.	1CT 1PF OAU 2SM	0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain high temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL	AC1-5T WIRING	PT11 INP=ST1 I INP=SN4 DIAGRAM R5485 data I/0 UT1 OUT2 (4)A 7(2)A 7 (2)A 7 (2)A 7 (2)A	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω 40/-19.9 + 99.9/12 [<±0.3°C(-30+130°),± 40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS 0 10 11 V + V _M V- 6 [7]	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C] (ata 1/0) 0UT1 0UT2 12(4)A 7(2)A (1 [2] 3] 4] [5]	[<±2°F(-60÷999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (●), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make (1CH=REF for refrigerating control, 1CH=HEA for heating control); then ad Start autotuning During normal operation, keep buttons [] + (●) pressed for 3 seconds. 1C ² time in order to define the dynamic of the process to be controlled. To above press (●) + (●) or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the at when power is resumed, after the initial autotest phase, the controller resis without modifying the previous control parameters, keep button (●) pressed successfully, the controller updates the control parameters and start to contend Errors If the autotuning function failed, the display shows an error code: ■ E1 timeout1 error: the controller could not bring the temperature within 1 control, vice versa, decrease 1SP in case of refrigerating control and re-stat ■ E2 timeout2 error: the autotuning has not ended within the maximum timp process and set a longer cycle time 1CT .	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. T blinks on the display. With ① + ⑦ or ④ set the cycle rt the autotuning function, press ⑧; to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, ed for 3 seconds. After the autotuning has taken place trol. the proportional band. Increase 1SP in case of heating at the process. me allowed (1000 cycle times). Re-start the autotuning	1CT 1PF OAU	0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain high temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL	AC1-5T	PT11 INP=ST1 INP=SN4 DIAGRAM RS485 data I/O UT1 QIA 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω 40/-19.9 + 99.9/12 [<±0.3°C(-30+130°),± 40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS 9 10 11 V V VN V- 6 7 0	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C] UT1 OUT2 (data I/O) OUT1 OUT2 12(4)A 7(2)A (1) [2] 3] 4] 5] (15230V~	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (●), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM =PID; make (1CH =REF for refrigerating control, 1CH =HEA for heating control); then ad Start autotuning During normal operation, keep buttons ① + ⑦ pressed for 3 seconds. 1CT time in order to define the dynamic of the process to be controlled. To above press ⑦ + ▲ or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the a when power is resumed, after the initial autotest phase, the controller resis without modifying the previous control parameters, keep button X presses successfully, the controller updates the control parameters and start to cont Errors If the autotuning function failed, the display shows an error code: ■ E1 timeout1 error: the controller could not bring the temperature within 1 control, vice versa, decrease 1SP in case of refrigerating control and re-stat ■ E2 timeout2 error: the autotuning has not ended within the maximum time process and set a longer cycle time 1CT . ■ E3 temperature overrange: check that the error was not caused by a pro- control, vice versa increase 1SP in case of refrigerating control and then re- stores of the set of the form the teror the set of the form the teror was not caused by a pro- control, vice versa increase 1SP in case of refrigerating control and then re- stores of the set of the set of the form the teror was not caused by a pro- control, vice versa increase 1SP in case of refrigerating control and then re- stores of the set of the set of the form the teror was not caused by a pro- control, vice versa increase 1SP in case of refrigerating control and then re-	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. T blinks on the display. With () + () or () set the cycle rt the autotuning function, press (); to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, d for 3 seconds. After the autotuning has taken place trol. the proportional band. Increase 1SP in case of heating at the process. me allowed (1000 cycle times). Re-start the autotuning be malfunction, then decrease 1SP in case of heating e-start the process.	1CT 1PF OAU 2SM	0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain high temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH)	AC1-5T	PT11 INP=ST1 INP=SN4 DIAGRAM RS485 data I/O UT1 OUT2 (4)A 7(2)A 7(00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω (LAE ST1) NTC 10K Ω 40/-19.9 + 99.9/12 [<±0.3°C(-30+130°),± 40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS 9 10 11 V V VN V- 6 7 0	[<±1°C(-50+850°), ±2°C]	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
Button (), when pressed for 3 seconds, allows the controller to be put on a stan KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, whice in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make (1CH=REF for refrigerating control, 1CH=HEA for heating control); then ad Start autotuning During normal operation, keep buttons [] + () pressed for 3 seconds. 1C ² time in order to define the dynamic of the process to be controlled. To above press () + () or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the at when power is resumed, after the initial autotest phase, the controller ress without modifying the previous control parameters, keep button () presses successfully, the controller updates the control parameters and start to con- Errors If the autotuning function failed, the display shows an error code: a E1 timeout1 error: the cantroller could not bring the temperature within 1 control, vice versa, decrease 1SP in case of refrigerating control and re-star a E3 temperature overrange: check that the error was not caused by a pro- control, vice versa increase 1SP in case of refrigerating control and then re- a To eliminate the error indication and return to the normal mode, press but Control improvement	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. T blinks on the display. With () + () or () set the cycle rt the autotuning function, press (); to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, d for 3 seconds. After the autotuning has taken place trol. the proportional band. Increase 1SP in case of heating at the process. me allowed (1000 cycle times). Re-start the autotuning be malfunction, then decrease 1SP in case of heating e-start the process.	1CT 1PF OAU 2SM	0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH)	AC1-5T	PT11 INP=ST1 INP=SN4 DIAGRAM RS485 data I/O UT1 QIA 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A 7(2)A	00 -50/-19.9+99.9/150 [< ±0.3°C] PTC 1000 Ω (LAE ST1) [<±0.3°C(-30+130°),± NTC 10K Ω (LAE SN4) [<±0.3°C(-40+100°),± [<±0.3°C(-40+100°),±] S AC1-5AS2RW-B	[<±1°C(-50+850°), ±2°C] 0°C -50 ÷ 150°C 1°C] [<±0.3°C(-30+130°), ±1°C] 5°C -40 ÷ 125°C 1°C] [<±0.3°C(-40+100°),±1°C] UT1 OUT2 (data I/O) OUT1 OUT2 12(4)A 7(2)A (1) [2] 3] 4] 5] (15230V~	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
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Caution: a high the of instability. that OS1 =0 and SIM =0. sed till the controller shows 0AD . 0, inserting a constant correction over the whole scale	ICT 1CT 1PF OAU 2SM SBF=WSS SBF=WSS 2SF 2SF 2SF 2SF	0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL SPLSPH	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be ATM</i>). AL0: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>) WONOFF control in refrigeration (2SM=ABS, 2CH=REF) Temperature differential relative to 1SP. The auxiliary output setpoint is equal to 1SP+2DF (SM=ABS, 2CH=REF) ON/OFF control in refrigeration. Setpoint 2 ON/OFF control in refrigeration. ON/OFF control in refrigeration. ON/OFF control in refrigeration. Setpoint 1 setper 1SP+2DF (SM=ABS, 2CH=REF) ON/OFF control in refrigeration. ON/OFF control in heating (2SM=ABS, 2CH=REF) ON/OFF control in refrigeration. Setpoint 2	AC1-5T WIRING	PT11 INP=ST1 I INP=SN4 DIAGRAM RS485 data I/0 UT1 OUT2 (4)A 7(2)A 2 3 4 5 Get Cata I/0 IT1 OUT2 (2 4 5 (3 5) (4 5) (4 5) (4 5) (5 6) (4 5) (5 6) (6 7) (7 2)A (7	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω -50/-19.9 + 99.9/15 (LAE ST1) ITC 10K Ω -40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS AC1-5AS2RW-B 9 10 11 V + VN V- 0 7 9 10 11 W R W 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7	[<±1°C(-50+850°), ±2°C]	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°), ±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
 Button (●), when pressed for 3 seconds, allows the controller to be put on a stant KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which in a public place. In the INFO menu, set parameter LOC=YES to inhibit all of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make (1CH=REF for refrigerating control, 1CH=HEA for heating control); then add Start autotuning During normal operation, keep buttons (1) + (●) pressed for 3 seconds. 1CT time in order to define the dynamic of the process to be controlled. To abor press (●) + (●) or wait for 30 seconds. During autotuning During the entire autotuning phase, the display alternates TUN with the a when power is resumed, after the initial autotest phase, the controller rest without modifying the previous control parameters, keep button (●) presses successfully, the controller updates the control parameters and start to control, vice versa, decrease 1SP in case of refrigerating control and re-state. E 1 timeout1 error: the controller could not bring the temperature within the rocess and set a longer cycle time 1CT. E 3 temperature overrange: check that the error was not caused by a precontrol, vice versa increase 1SP in case of refrigerating control and then rest to be control improvement. To reduce overshoot, reduce the integral action reset 1AR To increase the response speed of the system, reduce the proportional ban. To reduce syntegs in steady-state temperature, increase the integral actio its response speed is decreased. To increase the system sensitive to small variations and it may be a source source and the controller off then on again. During the autotole off then on	h might be attempted when the controllers is operating I functions of the buttons. To resume normal operation sure that 1CH matches the desired operation mode just setpoint 1SP at the desired value. T blinks on the display. With (j + ♥ or ▲ set the cycle rt the autotuning function, press ¥ ; to start autotuning ctual temperature measured. In case of power failure, umes the autotuning function. To abort the autotuning, df or 3 seconds. After the autotuning has taken place trol. the proportional band. Increase 1SP in case of heating at the process. me allowed (1000 cycle times). Re-start the autotuning obe malfunction, then decrease 1SP in case of heating e-start the process. utton ¥]. d 1PB . Caution: doing this makes the system less stable. on time 1IT ; system stability is thus increased, although prease the derivative action time 1DT . Caution: a high e of instability. that OS1= 0 and SIM= 0. sed till the controller shows 0AD . 0, inserting a constant correction over the whole scale ment scale with a proportional correction between the	ICT 1CT 1PF OAU 2SM SBF=WSS SBF=WSS 2SF 2SF 2SF 2SF	0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL SPLSPH	Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently th overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlle reacts to temperature variations, the smaller the cycle time must be, in order to obtain highe temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be ATM</i>) THR: output programmed for second thermostat control (<i>the next parameter will be 2SM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>) WORFF	AC1-5T WIRING	PT11 INP=ST1 I INP=SN4 DIAGRAM RS485 data I/0 UT1 OUT2 (4)A 7(2)A 2 3 4 5 Get Cata I/0 IT1 OUT2 (2 4 5 (3 5) (4 5) (4 5) (4 5) (5 6) (4 5) (5 6) (6 7) (7 2)A (7	00 -50/-19.9+99.9/150 [<±0.3°C] PTC 1000 Ω -50/-19.9 + 99.9/15 (LAE ST1) ITC 10K Ω -40/-19.9 + 99.9/12 [<±0.3°C(-40+100°),± IS AC1-5AS2RW-B 9 10 11 V + VN V- 0 7 9 10 11 W R W 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7	[<±1°C(-50+850°), ±2°C]	[<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°), ±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]

control (REF) or heating control mode (HEA) for the auxiliary output.
thermostat 2. With 2HY=0 the auxiliary output always remains off.
ime. has been turned off, it remains inactive for 2T0 minutes regardless of the temperature ed.
ime. has been turned on, it remains active for 2T1 minutes regardless of the temperature ed.
ut state in case of probe failure.
Id management. erature alarms are inhibited (<i>the following parameter will be</i> SB). es programmed in ALA and AHA represent the real alarm thresholds. s programmed in ALR and AHR are alarm differentials referred to 1SP and 1SP+1HY .
-ALR 1SP 1SP+1HY+AHR 1SP-1HY-ALR 1SP 1SP+AHR
re alarm with relative thresholds, g control (ATM=REL, 1CH=REF) Temperature alarm with relative thresholds, heating control (ATM=REL, 1CH=HEA).
ure alarm threshold.
ture alarm threshold.
ure alarm differential. he low temperature alarm is excluded
ture alarm differential. he high temperature alarm is excluded
alarm temperature warning.
on enabling.
selection (see table of input specifications).
AC1-5A, AC1-5J, AC1-5T only.
ge value (<i>in the models AC1-5A, AC1-5I only</i>) e minimum value measured by the transmitter (i.e. the value matching 0V, 0/4mA).
ge value (<i>in the models</i> AC1-5A, AC1-5I only) maximum value measured by the transmitter (i.e. the value matching 1V, 20mA)
et.
mum temperature (TLO) and maximum temperature (THI) logging.
own
s for BC communication

TECHNICAL DATA

Power supply AC1-5...D 12Vac/dc ±10%, 2W AC1-5...W 110 - 230Vac±10%, 50/60Hz, 2W

Relay outputs (AC1-5..R..) OUT1 12(4)A OUT2 7(2)A

SSR drive (AC1-5..M..) OUT1 15mA 12Vdc

Inputs see table of input specifications

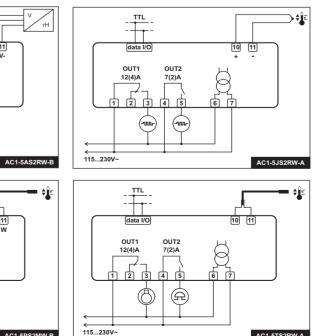
Measurement range see table of input specifications

Measurement accuracy see table of input specifications

Operating conditions -10 ... +50°C; 15%...80% U.R.

CE (Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front protection





Two channel universal Controller, ON/OFF or PID

Runs on mains power supply \bullet PID with autotuning or ON/OFF control \bullet Main output on 12A relay or for SSR-piloting and auxiliary output on 5A relay \bullet Input for $0 \div IV$, $0/4 \div 20$ mA, PTC/NTCIOK, TC J/K or Pt100 \bullet 0.1 / 1°C or 1°F resolution \bullet Selectable Refrigerating/Heating (Dehumidifying/Humidifying) control \bullet Absolute or relative temperature alarms \bullet ON/OFF button on front \bullet Load start limitation and safety operation in case of probe failure \bullet Quick programming through ZOT-AC1 key \bullet Connection to LAE TAB supervisory systems

APPLICATIONS:

Temperature: on control panels for small cold stores, heating systems, heated cupboards, bains-marie, ovens, laboratory equipment.

Humidity: control panels for greenhouses, seasoning cells, cold rooms, air-conditioned rooms.

AUT-27 Series								
Functions	AC1-27T		AC1-27P	AC1-27J		AC1-27A	AC1-27I	
Input type	PTC	NTC10K	Pt100	TC "J"	TC "K"	0÷1V	0/4÷20mA	
Range	-50÷150°C -60÷300°F	-40÷125°C -40÷260°F	-100÷850°C -150÷999°F	-50÷750°C -50÷999°C Cor -60÷999°F -60÷999°F		Configurat	ole in setup	
Accuracy	±0.3°C	±0.3°C	±0.3°C ^(a) ; ±1°C ^(b)	±3	°C	±3mV	±0.2mA	
Resolution	().1/1°C/1°	F	1 °C	;∕°F	0.1/	1	

AC1 27 Carles

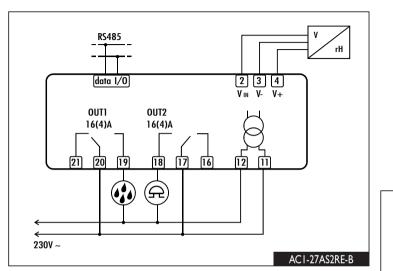
(a) -50÷150°C; (b) remaining range.

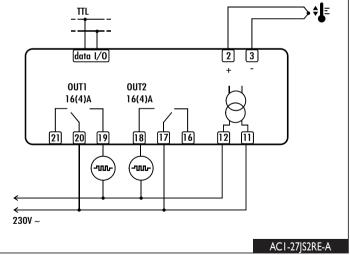


AC1-27		T	S	1	R	E	-B		
		0	2	3	4	5	6		
POS.	FUNCTION	DESCRIPTION							
0	Input	$\mathbf{A} = 0 \div 1V$; $\mathbf{I} = 0/4 \div 20$ mA; $\mathbf{J} = TC 'J' / 'K'$; $\mathbf{P} = Pt100$; $\mathbf{T} = PTC/NTC10K$							
2	Connections	S = built-in screw terminals							
3	Output No.	1 = one; 2 = two							
4	Output type	R = relay; M = Out1 on SSR, Out2 on relay							
5	Supply	D = 12Vac/dc; E = 230Vac 50/60Hz; U= 115Vac 50/60Hz 3 W							
6	Serial comm.	Nil = no; -A = TTL; -B = RS485							

How to order:

ACI-27JS1RE-B (TC J/K input, screw terminals, I relay output, 230Vac supply voltage, RS485 port). ACI-27JS2MD-A (0/4÷20mA input, screw terminals, output I on SSR drive, output 2 on relay, 12Vac/dc supply voltage, TTL port)





Temperature: on control panels for small cold stores, heating systems, heated cupboards, bains-marie, ovens, laboratory equipment. **Humidity**: control panels for greenhouses, seasoning cells, cold rooms, air-conditioned rooms.

AC1-27 INSTRUCTION FOR USE	CONFI	GURATION	I PARAMETERS	2CH	REF: HE	A Refrigerating	g control (REF) or heating of	control mode (HEA) for the aux	xiliary output.
Thank you for having chosen a LAE electronic product. Before installing the instrument, please read these instructions carefully			neter configuration menu, press button () + (i) for 5 seconds.	2HY		Differential of	of thermostat 2. With 2HY =(0 the auxiliary output always re	emains off.
to ensure maximum performance and safety.		on 🛡 or 🔺 sele tton 🚺 to display	ect the parameter to be modified. / the value.	<u> </u>	030mir			nains inactive for 2T0 minutes re	enardless of the temperature
DESCRIPTION	 By keepi 	ng button i pre	ssed, use button $\overline{\mathbf{v}}$ or $\overline{\mathbf{A}}$ to set the desired value. ed, the newly programmed value is stored and the following parameter is displayed.	F= NV0 2T1		value measu			gardiess of the temperature
OUT1 Channel 1 output			is but to $\textcircled{0}$ or wait for 30 seconds.	ຽ 2T1	030mir			mains active for 2T1 minutes re	gardless of the temperature
Channel 2 output	PAR	RANGE	DESCRIPTION			value measu	ured.		3
L1 Channel 1 setpoint modification L2 Channel 2 setpoint modification	SCL	1°C; 2°C;	Readout scale (see table of input specifications) Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to reconfigure the param-	- 2PF	ON/OFF	,	tput state in case of probe f	failure.	
AC1-27		°F	eters relevant to the absolute and relative temperatures (SPL, SPH, 1SP, 1HY etc)		ABS;	NON: all tem	nperature alarms are inhibite	ed (the following parameter will	
	SPL	-50°SPH	Minimum limit for 1SP setting		REL			nd AHA represent the real alarr	
	SPH	SPL150°		_		ON	-	ON	ı
Fig.1 - Front panel Increase / Modify Setpoint 2 button U Exit / Stand-by button	1SP 1CM	HY; PID	Setpoint (value to be maintained in the room). Control mode.	-		OF <u>F</u>		T[°]	T[°]
INSTALLATION			With 1CM=HY you select control with hysteresis: parameters 1HY, 1T0 and 1T1 are used.				SP-ALR ISP 1SP+1HY+AH		ALR 1SP 1SP+AHR
The AC1-27 controller, size 72x94x47 mm (WxHxD), is to be secured to a DIN rail in such a position as to ensure that no liquid infiltrates causing serious damage and compromising safety;			With 1CM=PID you select a Proportional-Integral-Derivative control mode: parameters 1PB, 1IT, 1DT, 1AR, 1CT will be used	3			ture alarm with relative threating control (ATM=REL, 1CH	iomporataro alam	n with relative thresholds, ATM=REL, 1CH=HEA).
All Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic	1CH	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode.	တ္တ ALA	-50°AH	A Low tempera	ature alarm threshold.		
 disturbance, keep the sensor and signal cables well separate from the power wires. ■ Place the probe T1 inside the room in a point that truly represents the temperature of the stored product. 	1H)	019.9°	OFF/ON thermostat differential. With 1HY= 0 the output is always off.	M=AE					
OPERATION				AHA	ALA150)° High temper	rature alarm threshold.		
DISPLAY During normal operation, the display shows either the temperature measured or one of the following indications:					-12.00		ature alarm differential.) the low temperature alarm	n is excluded	
$_{D}FF$ Controller in stand-by E_{Lin} Controller in autotuning	≽		1SP 1SP+1HY T[°] 1SP-1HY 1SP T[°]		१ 012.0°	' High temper	rature alarm differential.		
ρ_{II} Probe T1 overrange or failure E_{II} In tuning: timeout1 error h_{II} Room high temperature alarm E_{II} In tuning: timeout2 error	1 W		ON/OFF refrigerating control (1CM=HY, 1CH=REF) ON/OFF heating control (1CM=HY, 1CH=REF)		0120mi		0 the high temperature alarr		
Lo Room low temperature alarm E3 In tuning: overrange error	₩ 1T0	030min		ATD SB	NO/YES		e alarm temperature warnin utton enabling.	ıg.	
MENU INFO			After output 1 has been turned off, it remains inactive for 1T0 minutes regardless of the temperature value measured.		0mA/4mA		It selection (see table of inp	out specifications).	
The information available in this menu is:	1T1	030min	Minimum on time. (the following parameter will be 1PF). After output 1 has been turned on, it remains active for 1T1 minutes regardless of the temperature		T1/T2 ST1/SN4		· ·	. ,	
LL Minimum temperature recorded			value measured.	RLO			els AC1-27A, AC1-27J, A nge value (in the models A	C1-27A, AC1-27I only)	
Access to menu and information displayed. ■ Press and immediately release button [1].	1PE	019.9°				RLO takes t	the minimum value measure	ed by the transmitter (i.e. the v	value matching 0V, 0/4mA).
■ With button 🖲 or 🛋 select the data to be displayed.			Temperature control takes place by changing the	RHI	RLO99.			AC1-27A, AC1-27I only) ed by the transmitter (i.e. the v	alue matching 1V, 20mA)
 Press button (i) to display value. To exit from the menu, press button (b) or wait for 10 seconds. 			ON time of the output: the closer the temperature to the setpoint, the less time of activation. A small	OS1	-12.512.	5° Probe T1 of	fset.		
Reset of THI, TLO recordings ■ With button ♥ or ▲ select the data to be reset.			proportional band increases the promptness of response of the system to temperature variations,	TLD	130mir	n Delay for mi	inimum temperature (TLO)	and maximum temperature (T	HI) logging.
 ■ Display the value with button ①. ■ While keeping button ⑦ pressed, use button ④. 			but tends to make it less stable. A purely proportional control stabilises the temperature	SIM	0100	Display slow	vdown		
CHANNEL 1 SETPOINT (display and modification of desired temperature value)			within the proportional band but does not cancel	ADR	1255	AC1-27 add	Iress for PC communication	1	
 Press and release button II: the LED L1 blinks, the display shows 1SP for 1 second and then the setpoint associated value. Press buttons V or A to set the desired value (adjustment is within the minimum SPL and maximum SPH limit). 			the deviation from setpoint. Time With 1PB= 0 the output is always off.	INDIIT	SPECIFIC	CATIONS			
 To store the new value press button , or wait for 10 seconds. To go back to normal mode without saving the new value, press (0). 	11T	0999s	Integral action time. Overshoot		SF LOII N	CATIONS	1		
CHANNEL 2 SETPOINT			The steady-state error is cancelled by inserting an	MODEL		NPUT	RAN	IGE [MEASUREMENT ACCU	RACY]
With the auxiliary output set as thermostat control (OAU=THR), it's possible to modify setpoint 2 during the normal operation			integral action The integral action time determines				SCL=1°C	SCL=2°C	SCL=°F
of the controller.			the speed with which the steady-state temperature						002 1
of the controller. Press and release button (E): the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (SM-RS) alternatively the display shows 2DE if patient 2 is a threshold relative to patient 1 (SM-RE), then the value			the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the provide the speed (11T low) may be the provide the speed with the speed state temperature is achieved, but a high speed (11T low) may be the provide the speed state temperature is achieved in the speed state temperature is ac	AC1-27A.		0÷1V	RLO+RH	HI [< ± 3mV]	
■ Press and release button Le: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears.			the speed with which the steady-state temperature	AC1-27A.	INP = 0mA	0÷20mA		HI [< ± 3mV]	
Press and release button Le: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value			the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled.		INP = 0mA	0÷20mA 4÷20mA		II [< ± 0.2mA]	
 Press and release button E: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons a or the desired value. To store the new value press button or value for 10 seconds. To go back to normal mode without saving the new value, press of. 		0999s	the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response.		INP = 0mA INP = 4mA INP=T1	0÷20mA 4÷20mA TC "J"		II [< ± 0.2mA] -50÷750°C [< ±3°C]	
 Press and release button the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons or to set the desired value. To store the new value press button or vait for 10 seconds. 	1CM=PID	0999s	the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response. With 1IT =0 the integral control is disabled.	AC1-27I AC1-27J	INP = 0mA INP = 4mA INP=T1 INP=T2	0+20mA 4+20mA TC "J" TC "K"	- RLO+RH	II [< ± 0.2mA] -50÷750°C [< ±3°C] -50÷999°C [< ±3°C]	 -60÷999°F [< ±5°F]
 Press and release button	1CM=PID	- 0999s	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT	AC1-27I	INP = 0mA INP = 4mA INP=T1 INP=T2	0÷20mA 4÷20mA TC "J"		II [< ± 0.2mA] -50÷750°C [< ±3°C]	 -60+999°F [< ±5°F] -150+999°F
 Press and release button	1CM=PID	0999s	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With	AC1-27I AC1-27J	INP = 0mA INP = 4mA INP=T1 INP=T2	Λ 0+20mA Λ 4+20mA TC "J" TC "K" PT100 PTC 1000 Ω	- RLO+RH -50/-19.9+99.9/150°C [< ±0.3°C] -50/-19.9 + 99.9/150°C	II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 ÷ 150°C	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F
 Press and release button	1CM=PID	0999s	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 11T=0 the integral control is disabled.	AC1-27I AC1-27J	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=T2 INP=ST1	Λ 0÷20mA Λ 4÷20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) PTC 1000 Ω	- RLO+RH -50/-19.9+99.9/150°C [< ±0.3°C] -50/-19.9 + 99.9/150°C [<±0.3°C(-30+130°),±1°C]	II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 ÷ 150°C [<±0.3°C(-30+130°), ±1°C]	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [< ±0.6°F(-20+260°),±2°F]
 Press and release button	1CM=PID	0999s	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative action is disabled.	AC1-27I AC1-27J AC1-27J.	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1	Λ 0+20mA Λ 4+20mA TC "J" TC "K" PT100 PTC 1000 Ω		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 ÷ 150°C	
 Press and release button is: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons if or it to set the desired value. To store the new value press button if or wait for 10 seconds. To go back to normal mode without saving the new value, press is. STAND-BY Button it is a second, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode 	1CM=PID		the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB	AC1-271 AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 . F INP=ST1 INP=SN4	Λ 0+20mA Λ 4+20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) NTC 10K Ω		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 ÷ 150°C [<±0.3°C(-30÷130°), ±1°C] -40 ÷ 125°C	
 Press and release button			the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled.	AC1-271 AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=T2 INP=ST1	Λ 0+20mA Λ 4+20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) NTC 10K Ω		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 ÷ 150°C [<±0.3°C(-30÷130°), ±1°C] -40 ÷ 125°C	
 Press and release button is: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press button in or to be the desired value. To store the new value press button in or wait for 10 seconds. To go back to normal mode without saving the new value, press is. STAND-BY Button is, when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons [] + pressed for 3 seconds. 1CT blinks on the display. With [] + or (] set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function, press (]); to start autotuning 		0100%	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time.	AC1-27I AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=T2 INP=ST1 INP=SN4	Λ 0+20mA Λ 4+20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) NTC 10K Ω		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C]	
 Press and release button IP: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press button IP or ID to set the desired value. To store the new value press button IP or wait for 10 seconds. To go back to normal mode without saving the new value, press ID. STAND-BY Button ID, when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Stat autotuning During normal operation, keep buttons I + IP pressed for 3 seconds. 1CT blinks on the display. With I + IP or A set the cycle 		0100%	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST1 INP=SN4	Λ 0÷20mA Λ 4÷20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω NTC 10K Ω LAE SN4)	RLO+RH	II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C]	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
 Press and release button IP: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press button IP or ID to set the desired value. To store the new value press button IP or wait for 10 seconds. To go back to normal mode without saving the new value, press ID. STAND-BY Button ID, when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons 1 + IP pressed for 3 seconds. 1CT blinks on the display. With 1 + IP or A set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function, press ID; to sat autotuning press IP + A or wait for 30 seconds. 		2 0100%	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations.	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=T2 INP=ST1 INP=SN4	Λ 0÷20mA Λ 4÷20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) NMS		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C]	
 Press and release button (a): the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons (a) or (b) to set the desired value. To store the new value press button (c) or wait for 10 seconds. To go back to normal mode without saving the new value, press (b). STAND-BY Button (b) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons (1) + (c) pressed for 3 seconds. 1CT blinks on the display. With (1) + (c) or (a) set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function, press (b); to start autotuning press (c) + (a) or wait for 30 seconds. During nutotuning During the entire autotuning phase, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning hase keen place 		 0100% 1255s ON/OFF 	the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure.	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 INP=SN4	Λ 0÷20mA Λ 4÷20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) NMS	RLO+RH	II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C]	
 Press and release button is the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press button in or to be the desired value. To store the new value press button if or wait for 10 seconds. To go back to normal mode without saving the new value, press (b). STAND-BY Button (b), when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons [] + pressed for 3 seconds. 1CT blinks on the display. With [] + or all set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function, press (b); to start autotuning press p + all or wait for 30 seconds. 		 0100% 1255s ON/OFF NON; THR; 	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM)	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 INP=SN4	0÷20mA 4÷20mA TC "J" TC "K" PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4)		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C] -TL 	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] -40 + 260°F [<±0.6°F(-40+210°), ±2°F]
 Press and release button (a): the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF; if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons (a) or (b) to set the desired value. To store the new value press button (c) or wait for 10 seconds. To go back to normal mode without saving the new value, press (b). STAND-BY Button (c) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons (i) + (c) pressed for 3 seconds. 1CT blinks on the display. With (i) + (c) or (c) set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function, press (c); to start autotuning phase, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the control resumes the autotuning function. To abort the autotuning function, the autotuning has taken place successfully, the controller updates the control parameters and start to control. Errors If the autotuning function failed, the display shows an error code:<td></td><td>2 0100% 1255s ON/OFF NON;</td><td>the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM).</td><td>AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T</td><td>INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 B DIAGRA</td><td>0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]</td><td></td><td>II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C] -TL </td><td> </td>		2 0100% 1255s ON/OFF NON;	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM).	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 B DIAGRA	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C] -TL 	
 Press and release button		2 0100% 2 0100% 3 1255s 0N/OFF NON; THR; AL0; AL1	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM).	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 INP=SN4	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]		II [< ± 0.2mA] -50+750°C [< ±3°C] -50+999°C [< ±3°C] -100+850°C [<±1°C(-50+850°), ±2°C] -50 + 150°C [<±0.3°C(-30+130°), ±1°C] -40 + 125°C [<±0.3°C(-40+100°),±1°C]	
 Press and release button (a): the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (25M=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (25M=REL), then the value associated to the parameter appears. Press buttons (a) or (b) to set the desired value. To store the new value press button (c) or wait for 10 seconds. To go back to normal mode without saving the new value, press (b). STAND-BY Button (c) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons () + () pressed for 3 seconds. 1CT blinks on the display. With () + () or () set at autotuning press () + () or wait for 30 seconds. During the entire autotuning phase, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning, without modifying the previous control parameters, keep button (). Errors If the autotuning function failed, the display shows an error code: If time outform function failed, the display shows an error code: If time outform function fail		2 0100% 2 0100% 3 1255s 0N/OFF NON; THR; AL0; AL1	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM).	AC1-271 AC1-27J AC1-27J AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 G DIAGRA (data 1/0) OUT1 I6(4)A	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]		$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 1^{\circ}C(-50+850^{\circ}), \pm 2^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$	
 Press and release button		 0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL 	the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM). THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL)	AC1-271 AC1-27J AC1-27J AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 G DIAGRA (data 1/0) OUT1 I6(4)A	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]		$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 1^{\circ}C(-50+850^{\circ}), \pm 2^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$	
 Press and release button		 0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL 	the speed with which the steady-state temperature is achieved, but a high speed (IIT low) may be the cause of overshoot and instability in the response. With IIT=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (IDT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be ATM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts parameter temperature (<i>the next parameter will be 2CH</i>) Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>) Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>)	AC1-27I AC1-27J AC1-27J AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST1 INP=SN4 B DIAGRA	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]		$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C = 10^{\circ}C =$	 -60+999°F [< ±5°F] -150+9999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] [<±0.6°F(-40+210°), ±2°F]
 Press and release button (□): the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons (□) or (□) to set the desired value. To store the new value press button (□) or wait for 10 seconds. To go back to normal mode without saving the new value, press (□). STAND-BY Button (□), when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode ((1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons (1) + (•) pressed for 3 seconds. 1CT blinks on the display. With (1) + (•) or (a) set the cycle time in order to define the dynamic of the process to be controller. To abort the autotuning function, press (0): to start autotuning press (0): a seconds. During normal operation, has, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning the control resumes the control resumes the autotuning has taken place successfully, the controller updates the control parameters weethy to control abord. Lor		 0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL 	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (10T high) makes the system very sensitive to small temperature variations and causes instability. With 10T=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL) Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH) Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH)	AC1-27I AC1-27J AC1-27J AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 G DIAGRA (data 1/0) OUT1 I6(4)A	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS [2] Vw [17] [16] [17] [16]		$ [< \pm 0.2mA] \\ -50+750^{\circ}C [< \pm 3^{\circ}C] \\ -50+999^{\circ}C [< \pm 3^{\circ}C] \\ -100+850^{\circ}C \\ [<\pm 1^{\circ}C(-50+850^{\circ}), \pm 2^{\circ}C] \\ -50 \div 150^{\circ}C \\ [<\pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C] \\ -40 \div 125^{\circ}C \\ [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C] \\ \hline \\ -40 \div 125^{\circ}C \\ [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C] \\ \hline \\ 0UT1 \qquad 0UT2 \\ 16(4)A \qquad 16(4)A \\ \hline \\ 16(4)A \qquad 16(4)A \\ \hline \\ 16(4)A \qquad 16(4)A \\ \hline \\ 100 \\ \hline 1$	 -60+999°F [< ±5°F] -150+9999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] [<±0.6°F(-40+210°), ±2°F]
 Press and release button (■): the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons (a) or (b) to set the desired value. To store the new value press button (a) or valif for 10 seconds. To go back to normal mode without saving the new value, press (b). STAND-BY Button (b) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons (1 + ()) pressed for 3 seconds. 1CT blinks on the display. With (1 + ()) or (a) set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function. To abort the autotuning function. To abort the autotuning function. To abort the autotuning the autotuning hase, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the control resumes the autotuning function. To abort the autotuning has taken place successfully, the control parameters, keep button (0) pressed of 3 seconds.		 0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL 	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the Cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (10T high) makes the system very sensitive to small temperature variations and causes instability. With 10T=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM) THR: output programmed for second thermostat control (<i>the next parameter will be</i> ATM). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL) Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH)	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST4 INP=SN4 INP=SN4 INP=SN4 INP=SN4	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) AMS [2] Vs 0UT2 16(4)A [7] [6] [17] [6] [2] [17] [16] [2] [17] [16] [17] [16] [2] [17] [16] [2] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16]	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [= \pm 0.3^{\circ}C = 10^{\circ}C =$	 -60+999°F [< ±5°F] -150+9999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] [<±0.6°F(-40+210°), ±2°F]
 Press and release button		 0100% 1255s ON/OFF NON; THR; AL0; AL1 ABS; REL 	the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM). AL0: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL0: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL2: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM =ABS), or a differential relative to setpoint 1 (2SM =REL) Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH) ON/OFF control in refrigeration	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 B DIAGRA RS485 	0÷20mA 4÷20mA TC "J" TC "G" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4)	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 0.3^{\circ}C(-50+850^{\circ}), \pm 2^{\circ}C]$ $-50 + 150^{\circ}C [<\pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$ $-100 + 125^{\circ}C [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C]$	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] (<±0.6°F(-40+210°), ±2°F]
 Press and release button ([©]: the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons ([©]) or 0 to set the desired value. To so the new value press button ([©]) or wait for 10 seconds. To go back to normal mode without saving the new value, press ([®]). STAND-BY Button ([®]) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTROLLER AUTOTUNING IN PID MODE Before starting In the setup mode (see configuration parameters): set 1CM=PID: make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control), 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Start autotuning During normal operation, keep buttons ([®]) + [®] pressed for 3 seconds. 1CT blinks on the display, With ([®]) + [®] or [®] set the cycle time in order to define the dynamic of the process to be controller. To abort the autotuning function, press ([®]) to start autotuning press ([®]) + [®] or valit for 30 seconds. During autotuning During durb durb the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning function, ress ([®]) to start autotuning, without modifying the previous control parameters, keep button ([®]) reseed for 3 seconds. After the autotuning has taken place successfully. the controller updates the control parameters and st		0100% 1255s ON/OFF NON; THR; AL0; AL1 1 ABS; REL SP SPLSPH	the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled. Derivative action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATIM). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be</i> ATIM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM= ABS), or a differential relative to setpoint 1 (2SM= REL) Auxiliary output switchover temperature (<i>the next parameter will be</i> ATIM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM= ABS), or a differential relative to setpoint 1 (2SM= REL) Auxiliary output switchover temperature (<i>the next parameter will be</i> ATIM). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM= ABS), or a differential relative to setpoint 1 (2SM= REL) Auxiliary output switchover temperature (<i>the next parameter will be</i> 2CH) ON/OFF control in refrigeration (2SM= ABS, 2CH= REF)	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST4 INP=SN4 INP=SN4 INP=SN4 INP=SN4 INP=SN4	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) AMS [2] Vs 0UT2 16(4)A [7] [6] [17] [6] [2] [17] [16] [2] [17] [16] [17] [16] [2] [17] [16] [2] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16] [17] [16]	RLO+RH	$ [< \pm 0.2mA] \\ -50+750^{\circ}C [< \pm 3^{\circ}C] \\ -50+999^{\circ}C [< \pm 3^{\circ}C] \\ -100+850^{\circ}C \\ [<\pm 1^{\circ}C(-50+850^{\circ}), \pm 2^{\circ}C] \\ -50+150^{\circ}C \\ [<\pm 0.3^{\circ}C(-30+130^{\circ}), \pm 1^{\circ}C] \\ -40+125^{\circ}C \\ [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C] \\ -40+125^{\circ}C \\ [<\pm 0.3^{\circ}C(-40+100^{\circ}), \pm 1^{\circ}C] \\ \hline 0 \\ UT1 0 \\ 0 \\ UT1 0 \\ 16(4)A 16(4)A \\ 16(4)A $	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] (<±0.6°F(-40+210°), ±2°F]
 Press and release button		0100% 1255s ON/OFF NON; THR; AL0; AL1 1 ABS; REL SP SPLSPH	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be ATM</i>). AL0: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL0: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL0: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL2: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL) Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>) ON/OFF control in nefrigeration (2SM=ABS, 2CH=REF) Temperature differential relative to 1SP. The auxiliary output sepont is equal to 1SP+2DF	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=SN4 G DIAGRA RS485 	0÷20mA 4÷20mA TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) MMS 22 Vm 00T2 4 W 00T2	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C - 100+850^{\circ}, \pm 2^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C (-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 $	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] [<±0.6°F(-40+210°), ±2°F]
 Press and release button		0100% 1255s ON/OFF NON; THR; AL0; AL1 1 ABS; REL SP SPLSPH	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL) Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>) $\psi \circ ON = \frac{ON}{OFF} $	AC1-27I AC1-27J AC1-27J AC1-27T AC1-27T B WIRING 21 21 21 21 21 21 21 21 21 21 21 21 21	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST4 G DIAGRA RS485 	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) Vm 0UT2 IG(4)A (I7) T6 (I2) W 0UT2 IG(4)A (I7) T6 (I7) T6 (I7) T6 (I7) T6	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C - 100^{\circ}B50^{\circ}), \pm 2^{\circ}C]$ $-50 \div 150^{\circ}C [< \pm 0.3^{\circ}C (-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-50 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] (<±0.6°F(-40+210°), ±2°F]
 Press and release button (ⓐ the LED L2 blinks, the display shows 2SP for 1 second if septoint 2 is an absolute threshold (2SM=AB2, alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons (ⓐ) or (ⓑ to set the desired value. To store the new value press button (ⓐ) or wait for 10 seconds. To go back to normal mode without saving the new value, press (ⓑ). STAND=SY Button (ⓐ) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTECLER AUTOTUNING IN PID MODE Bofore starting In the setty mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (tCH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Stat autotuning During normal operation, keep buttons (〕 + (⑦) pressed for 3 seconds. 1CT blinks on the display With (〕 + (⑦) or (ⓐ) set the cycle time in order to define the dynamic of the process to be controller. To about the autotuning function, To about the autotuning function is a staten place. Uning the entire autotuning phase, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To about the autotuning, without modifying the previous control parameters, keep button (②) resumes to a seconds. After the autotuning, the autotuning, without modifying the previous control		0100% 1255s ON/OFF NON; THR; AL0; AL1 1 ABS; REL SP SPLSPH	the speed with which the steady-state temperature is achieved, but a high speed (11T low) may be the cause of overshoot and instability in the response. With 11T=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 11T). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). Setpoint 2 mode. Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL) Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>) $\phi_{FF} = ON/OFF control in refrigeration OFF = ON/OFF control in refrigeration OFF = ON/OFF control in refrigeration \phi_{FF} = ON/OFF = ONTOR in heating (2SM=ABS, 2CH=REF) Te auxiliary output setpoint is equal to 1SP+2DF \phi_{FF} = ON/OFF = ONTOR in the other onter other onter ont$	AC1-27I AC1-27J AC1-27J AC1-27T AC1-27T B WIRING 21 21 21 21 21 21 21 21 21 21 21 21 21	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST1 INP=SN4 B DIAGRA	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) Vm 0UT2 IG(4)A (I7) T6 (I2) W 0UT2 IG(4)A (I7) T6 (I7) T6 (I7) T6 (I7) T6	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C (-30+130^{\circ}), \pm 2^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C$	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] -60 + 300°F [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] (<±0.6°F(-40+210°), ±2°F]
 Press and release button (a) the LED L2 blinks, the display shows 2SP for 1 second if septoint 2 is an absolute threshold (2SM=AB2, alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttons (a) or (b) to set the desired value. To store the new value press button (a) or wait for 10 seconds. To go back to normal mode without saving the new value, press (b). STAND=SY Button (a) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTELER AUTOTUNING IN PID MODE Bofore starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setipoint 1SP at the desired value. Stat autotuning During normal operation, keep buttons (] + (*) pressed for 3 seconds. 1CT blinks on the display with (] + (*) or (a) set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function. To abort the autotuning the entire autotuning phase, the display alternates TUN with the actual temperature measured. In case of power failure, when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning, without modifying the previous control parameters, keep button (), the seconds. After the autotuning has taken place successfully, the controller collent coult bring the temperature within the proces. <		0100% 1255s ON/OFF NON; THR; AL0; AL1 1 ABS; REL SP SPLSPH	the speed with which the steady-state temperature is achieved, but a high speed (IIT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (10T high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON : output disabled (always off). (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be</i> ATM). AL1: contacts make when an alarm condition	AC1-27I AC1-27J AC1-27J AC1-27P AC1-27T B WIRING 2 2 2 1 2 1 2 2 1 2 2 1 2 2 1 1 2 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 2 1 2 1 2 1 1 2 1 1 1 2 1 2 1 1 1 2 1	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST4 G DIAGRA RS485 	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) Vm 0UT2 IG(4)A (I7) T6 (I2) W 0UT2 IG(4)A (I7) T6 (I7) T6 (I7) T6 (I7) T6	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C - 100+850^{\circ}, \pm 2^{\circ}C]$ $-50 + 150^{\circ}C [< \pm 0.3^{\circ}C (-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 + 125^{\circ}C [< \pm 0.3^{\circ}C (-40\pm100^{\circ}), \pm 1^{\circ}C]$ $-40 $	
 Press and release button (a) the LED L2 blinks, the display shows 2SP for 1 second if septoint 2 is an absolute threshold (2SM=AB2, alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value associated to the parameter appears. Press buttors (a) or (b) to set the desired value. To store the new value press button (c) or wait for 10 seconds. To go back to normal mode without saving the new value, press (c). STAND=Y Button (c) when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only). CEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO. CONTELER AUTOUNING IN PID MODE Bofer starting In the setue mode (see configuration parameters): set 1CM=PID: make sure that 1CH matches the desired operation mode (1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value. Stat autouning During normal operation, keep buttons (i) + (f) pressed for 3 seconds. 1CT blinks on the display. With (i) + (f) or (f) set the cycle time in order to define the dynamic of the process to be controller. To abort the autotuning function. To abort the autotuning function, nease of power failure, when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning, without modifying the previous control parameters, keep button (f) (f) the percess. Erime out to define the dynamic of the process to be controller to action. The secure versander set 1SP in case of refigerating c		0100% 1255s ON/OFF NON; THR; AL0; AL1 1 ABS; REL SP SPLSPH	the speed with which the steady-state temperature is achieved, but a high speed (IIT low) may be the cause of overshoot and instability in the response. With 1IT=0 the integral control is disabled. Derivative action time. Response overshoot may be reduced by inserting a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small temperature variations and causes instability. With 1DT=0 the derivative control is disabled. Reset of integral action time referred to 1PB Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT). Cycle time. Rult on the output ON time changes. The quicker the system to be controlled reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations. Output state in case of probe failure. AUX output operation. NON: output disabled (always off). (<i>the next parameter will be ATM</i>) THR: output programmed for second thermostat control (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1: contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>). Auxiliary output switchover temperature (<i>the ne</i>	AC1-27I AC1-27J AC1-27J AC1-27T AC1-27T B WIRING 21 21 21 21 21 21 21 21 21 21 21 21 21	INP = 0mA INP = 4mA INP=T1 INP=T2 INP=ST1 INP=ST4 G DIAGRA RS485 	0÷20mA 4÷20mA TC "J" TC "J" TC "K" PT100 PTC 1000 Ω (LAE ST1) NTC 10K Ω (LAE SN4) Vm 0UT2 IG(4)A (I7) T6 (I2) W 0UT2 IG(4)A (I7) T6 (I7) T6 (I7) T6 (I7) T6	RLO+RH	$II [< \pm 0.2mA]$ $-50+750^{\circ}C [< \pm 3^{\circ}C]$ $-50+999^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C]$ $-100+850^{\circ}C [< \pm 3^{\circ}C - 100^{\circ}B50^{\circ}), \pm 2^{\circ}C]$ $-50 \div 150^{\circ}C [< \pm 0.3^{\circ}C (-30+130^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-50 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$ $-40 \div 125^{\circ}C [< \pm 0.3^{\circ}C (-40+100^{\circ}), \pm 1^{\circ}C]$	 -60+999°F [< ±5°F] -150+999°F [<±2°F(-60+999°), ±4°F] [<±0.6°F(-20+260°),±2°F] [<±0.6°F(-40+210°), ±2°F] [<±0.6°F(-40+210°), ±2°F]

control (REF) or heating control mode (HEA) for the auxiliary output.
thermostat 2. With 2HY=0 the auxiliary output always remains off.
ime. has been turned off, it remains inactive for 2T0 minutes regardless of the temperature ed.
ime. has been turned on, it remains active for 2T1 minutes regardless of the temperature ed.
ut state in case of probe failure.
Id management. erature alarms are inhibited (<i>the following parameter will be SB</i>). es programmed in ALA and AHA represent the real alarm thresholds. s programmed in ALR and AHR are alarm differentials referred to 1SP and 1SP+1HY.
-ALR 1SP 1SP+1HY+AHR 1SP-1HY-ALR 1SP 1SP+AHR
re alarm with relative thresholds, g control (ATM=REL, 1CH=REF) Temperature alarm with relative thresholds, heating control (ATM=REL, 1CH=HEA).
ure alarm threshold.
ture alarm threshold.
ure alarm differential. he low temperature alarm is excluded
ture alarm differential. he high temperature alarm is excluded
alarm temperature warning.
on enabling.
selection (see table of input specifications).
AC1-27A, AC1-27J, AC1-27T only.
ge value (<i>in the models</i> AC1-27A, AC1-27I only) e minimum value measured by the transmitter (i.e. the value matching 0V, 0/4mA).
ge value (<i>in the models AC1-27A…, AC1-27I… only</i>) maximum value measured by the transmitter (i.e. the value matching 1V, 20mA)
et.
mum temperature (TLO) and maximum temperature (THI) logging.
own

TECHNICAL DATA

Power supply AC1-27...D 12Vac/dc±10%, 2W AC1-27...E 230Vac±10%, 50/60Hz, 2W AC1-27...U 110Vac±10%, 50/60Hz, 2W

Relay outputs (AC1-27..R..) OUT1 16(4)A OUT2 16(4)A

SSR drive (AC1-27..M..) OUT1 15mA 12Vdc

Inputs see table of input specifications

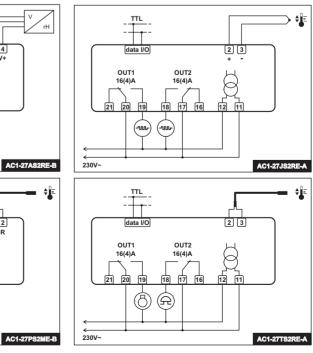
Measurement range see table of input specifications

Measurement accuracy see table of input specifications

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front protection





AC1-2W 110x53x75mm

Two channel universal Controller, ON/OFF or PID

Wall-mount controller • Runs on mains power supply • PID with autotuning or ON/OFF control • Outputs on relay or for SSR-piloting • Input for $0 \div IV$, PTC/NTCIOK • 0.1 / 1°C or 1°F resolution • Selectable Refrigerating/Heating (Dehumidifying/Humidifying) control • Absolute or relative temperature alarms • ON/OFF button on front • Load start limitation and safety operation in case of probe failure • Quick programming through ZOT-ACI key • Connection to LAE TAB supervisory systems

APPLICATIONS:

Temperature: control of small cold stores, swimming pools, heating systems, bains-marie, ovens, laboratory equipment.

Humidity: control of greenhouses, seasoning cells, cold rooms, air-conditioned rooms.



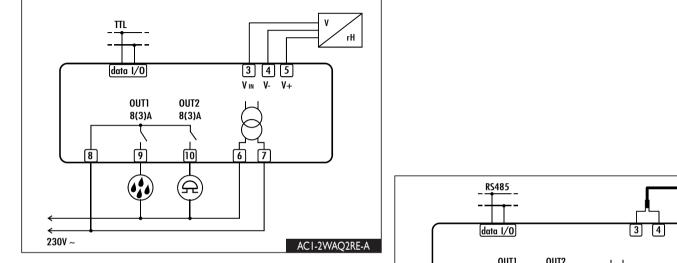
AC	1-2W	T Q		1	R	E	-В		
		0	2	3	4	5	6		
POS.	FUNCTION	DESCRIPTION							
0	Input	$\mathbf{A} = 0 \div 1V; \ \mathbf{T} = PTC/NTC10K$							
2	Connections	Q = detachable screw terminals							
3	Output No.	1 = one; 2 = two							
4	Output type	R = relay; F = SSR drives							
5	Supply	D = 12Vac/dc; E = 230Vac 50/60Hz; U = 115Vac 50/60Hz 3 W							
6	Serial comm.	Nil = no; -A = TTL ; -B = RS485							

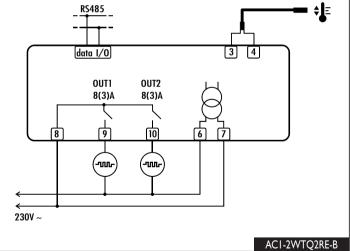
Functions	AC1-	2WT	AC1-2WA
Input type	PTC	NTC10K	0÷1V
Range	-50÷150°C -60÷300°F	-40÷125°C -40÷260°F	Configurable in setup
Accuracy	±0.3°C	±0.3°C	±3mV
Resolution	0.1/1°	C/1°F	0.1/1

AC1-2W Series

How to order:

ACI-2WTQ2RE-B (PTC/NTC10K input, detachable screw terminals, 2 relays, 230Vac supply voltage, RS485 port) ACI-2WAQ2RD-A (0+1V input, detachable screw terminals, 2 relays, 12Vac/dc supply voltage, TTL port)





AC1-2W INSTRUCTION FOR USE		ence instru kit from cali		sing button @.	2CH		
Thank you for having chosen a LAE electronic product. Before installing the instrument, please read these instructions carefully to ensure maximum performance and safety.			RATION	PARAMETERS	2HY	019.9° 030min	Differential of thermostat 2. With 2HY=0 the auxiliary output always remains off. Minimum off time.
DESCRIPTION INDICATION	 To get access to the parameter configuration menu, press button () + (i) for 5 seconds. With button (♥) or (▲) select the parameter to be modified. 						After output 2 has been turned off, it remains inactive for 2T0 minutes regardless of the temperature value measured.
our1 Channel 1 output	∎ Pr	ess button	i to display t		8 2T1	030min	Minimum on time. After output 2 has been turned on, it remains active for 2T1 minutes regardless of the temperature
Channel 2 output	∎ Wi	hen button	i is released	, the newly programmed value is stored and the following parameter is displayed. s button 例 or wait for 30 seconds.			value measured.
L1 Channel 1 setpoint modification		PAR		DESCRIPTION	2PF	ON/OFF	Auxiliary output state in case of probe failure.
L2 Channel 2 setpoint modification		SCL	1°C;	Readout scale (see table of input specifications)	ATM	NON; ABS;	Alarm threshold management. NON : all temperature alarms are inhibited (the following parameter will be SB).
Image: Second				Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to reconfigure the param- eters relevant to the absolute and relative temperatures (SPL, SPH, 1SP, 1HY etc)		REL	ABS : the values programmed in ALA and AHA represent the real alarm thresholds. REL : the values programmed in ALR and AHR are alarm differentials referred to 1SP and 1SP+1HY.
↓ ↓ </td <td></td> <td>SPL</td> <td>-50°SPH</td> <td>Minimum limit for 1SP setting</td> <td></td> <td></td> <td></td>		SPL	-50°SPH	Minimum limit for 1SP setting			
		SPH		Maximum limit for 1SP setting.			
Fig.1 - Front panel		1SP 1CM		Setpoint (value to be maintained in the room). Control mode.			1SP-ALR 1SP + 1HY + AHR 1SP - 1HY - ALR 1SP + AHR Temperature alarm with relative thresholds, Temperature alarm with relative thresholds, Temperature alarm with relative thresholds,
INSTALLATION			-	With 1CM=HY you select control with hysteresis: parameters 1HY, 1T0 and 1T1 are used. With 1CM=PID you select a Proportional-Integral-Derivative control mode: parameters 1PB, 1IT,			refrigerating control (ATM=REL, 1CH=REF) heating control (ATM=REL, 1CH=HEA).
The AC1-2W sizes 110x75x55 mm (WxHxD). Fix the plate to the panel using 2 cheese-headed screws with 4 or 5 mm diameter and then apply the instrument casing to the plate. This should be done for vertical panels and for correct positioning of the				1DT, 1AR, 1CT will be used.	SBATA	-50°AHA	Low temperature alarm threshold.
instrument with the outlets at the bottom. Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic		1CH		Refrigerating (REF) or Heating (HEA) control mode.	AHA	ALA150°	High temperature alarm threshold.
 disturbance, keep the sensor and signal cables well separate from the power wires. Place the probe T1 inside the room in a point that truly represents the temperature of the stored product. 		1HY	019.9°	OFF/ON thermostat differential. With 1HY=0 the output is always off.	ਕ ਜ ALR	-12.00°	Low temperature alarm differential.
OPERATION					ШЩ — — — — — — — — — — — — — — — — — — —	012.0°	With ALR=0 the low temperature alarm is excluded.
DISPLAY During normal operation, the display shows either the temperature measured or one of the following indications:				OFF OFF ISP 1SP +1HY T[°]	AHR	012.0	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.
DFF Controller in stand-by	 논			ON/OFF refrigerating control ON/OFF heating control	ATD	0120min	Delay before alarm temperature warning.
ρ_r Probe T1 overrange or failure E In tuning: timeout1 error h_I Room high temperature alarm E_P^2 In tuning: timeout2 error	15L	1T0	030min	(1CM=HY, 1CH=REF) (1CM=HY, 1CH=HEA) Minimum off time.	SB	NO/YES ST1/SN4	Stand-by button enabling. Sensor input selection (see table of input specifications).
Lo Room low temperature alarm E3 In tuning: overrange error				After output 1 has been turned off, it remains inactive for 1T0 minutes regardless of the temperature value measured.	INF		In the models AC1-2WT only.
MENU INFO The information available in this menu is:		1T1	030min	Minimum on time. (<i>the following parameter will be 1PF</i>).	RLO	-19.9RHI	Minimum range value (in the models AC1-2WA only)
Loc Keypad state lock				After output 1 has been turned on, it remains active for 1T1 minutes regardless of the temperature value measured.	RHI	RLO99.9	RLO takes the minimum value measured by the transmitter (i.e. the value matching 0V). Maximum range value (<i>in the models AC1-2WA only</i>)
LL Minimum temperature recorded Access to menu and information displayed.		1PB	019.9°	Proportional bandwidth.			RHI takes the maximum value measured by the transmitter (i.e. the value matching 1V)
 ■ Press and immediately release button ①. ■ With button ⑦ or ▲ select the data to be displayed. 				Temperature control takes place by changing the	OS1	-12.512.5°	Probe T1 offset.
■ Vries button ① to display value. ■ To exit from the menu, press button ④ or wait for 10 seconds.				ON time of the output: the closer the temperature to the setpoint, the less time of activation. A small	TLD	130min	Delay for minimum temperature (TLO) and maximum temperature (THI) logging.
Reset of THI, TLO recordings				proportional band increases the promptness of response of the system to temperature variations, response of temperature variations	SIM	0100	Display slowdown AC1-2W address for PC communication
 ■ With button (♥) or ▲ select the data to be reset. ■ Display the value with button 1. 				proportional control stabilises the temperature	ADR	1255	ACT-200 address for PC communication
 While keeping button i pressed, use button i. CHANNEL 1 SETPOINT (display and modification of desired temperature value) 				within the proportional band but does not cancel	INPUT S	PECIFICA	ATIONS
 Press and release button : the LED L1 blinks, the display shows 1SP for 1 second and then the setpoint associated value. Press buttons r or a to set the desired value (adjustment is within the minimum SPL and maximum SPH limit). 				With 1PB=0 the output is always off.			RANGE [MEASUREMENT ACCURACY]
 To store the new value press button e, or wait for 10 seconds. 		1IT		Integral action time.	MODEL	INP	UT SCL=1°C SCL=2°C SCL=°F
■ To go back to normal mode without saving the new value, press . CHANNEL 2 SETPOINT				The steady-state error is cancelled by inserting an integral action. The integral action time, determines	AC1-2WA	0÷1	1V RLO+RHI [< ± 3mV]
With the auxiliary output set as thermostat control (OAU=THR), it's possible to modify setpoint 2 during the normal operation of the controller.				the speed with which the steady-state temperature is achieved, but a high speed (1IT low) may be the			PTC 1000 Ω -50/-19.9 ÷ 99.9/150°C -50 ÷ 150°C -60 ÷ 300°F (LAE ST1) [<±0.3°C(-30÷130°),±1°C] [<±0.3°C(-30÷130°), ±1°C] [<±0.6°F(-20÷260°),±2°F]
Press and release button L2 the LED L2 blinks, the display shows 2SP for 1 second if setpoint 2 is an absolute threshold (2SM=ABS), alternatively the display shows 2DF, if setpoint 2 is a threshold relative to setpoint 1 (2SM=REL), then the value				With 1IT=0 the integral control is disabled.	AC1-2WT		$\frac{(242.511)}{(240.50+100.), ±1.Cj} = \frac{(240.50+100.), ±1.Cj}{(240.50+100.), ±1.Cj} = \frac{(240.50+100.), ±2.Cj}{(240.50+100.), ±2.Cj}$
associated to the parameter appears. ■ Press buttons (▲) or (▼) to set the desired value.	CM=						$(LAE \ SN4) [<\pm 0.3^{\circ}C(-40\pm100^{\circ}),\pm 1^{\circ}C] [<\pm 0.3^{\circ}C(-40\pm100^{\circ}),\pm 1^{\circ}C] [<\pm 0.6^{\circ}F(-40\pm210^{\circ}),\pm 2^{\circ}F]$
 To store the new value press button for or wait for 10 seconds. To go back to normal mode without saving the new value, press . 	-	1DT	0999s	Time Derivative action time. Overshoot	WIRING	DIAGRAN	15
STAND-BY		101		Response overshoot may be reduced by inserting 1SP		D0.405	
Button (1), when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only).				a derivative Action. A high derivative action (1DT high) makes the system very sensitive to small	-	<u>RS485</u>	
KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating				temperature variations and causes instability. With		lata I/O	3 4 data 1/0 3 4 5
in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO.				1DT=0 the derivative control is disabled.		OUT1 OUT	
CONTROLLER AUTOTUNING IN PID MODE				⊢ L Time		8(3)A 8(3)A	A 8(3)A 8(3)A 8
Before starting In the setup mode (see configuration parameters): set 1CM=PID; make sure that 1CH matches the desired operation mode		1AR		Reset of integral action time referred to 1PB		9 10	
(1CH=REF for refrigerating control, 1CH=HEA for heating control); then adjust setpoint 1SP at the desired value.				Decreasing the parameter 1AR reduces the integral control action zone, and consequently the overshoot (see figure on paragraph 1IT).			
During normal operation, keep buttons (i) + ♥ pressed for 3 seconds. 1CT blinks on the display. With (i) + ♥ or ▲ set the cycle time in order to define the dynamic of the process to be controlled. To abort the autotuning function, press (); to start autotuning		1CT		Cycle time. It's the period in which the output ON time changes. The quicker the system to be controlled		\downarrow \downarrow	
press 🗑 + 🛋 or wait for 30 seconds.				reacts to temperature variations, the smaller the cycle time must be, in order to obtain higher temperature stability and less sensitivity to load variations.	230V~		AC1-2WTQ2RE-B
During autotuning During the entire autotuning phase, the display alternates TUN with the actual temperature measured. In case of power failure,		1PF		Output state in case of probe failure.			
when power is resumed, after the initial autotest phase, the controller resumes the autotuning function. To abort the autotuning, without modifying the previous control parameters, keep button () pressed for 3 seconds. After the autotuning has taken place		OAU		AUX output operation.			
successfully, the controller updates the control parameters and start to control. Errors			AL0;	NON : output disabled (always off). (<i>the next parameter will be ATM</i>) THR : output programmed for second thermostat control (<i>the next parameter will be 2SM</i>).			
 If the autotuning function failed, the display shows an error code: E1 timeout1 error: the controller could not bring the temperature within the proportional band. Increase 1SP in case of heating 				AL0 : contacts open when an alarm condition occurs (<i>the next parameter will be ATM</i>). AL1 : contacts make when an alarm condition occurs (<i>the next parameter will be ATM</i>).			
control, vice versa, decrease 1SP in case of refrigerating control and re-start the process.		2SM	· · ·	Setpoint 2 mode.			
E2 timeout2 error: the autotuning has not ended within the maximum time allowed (1000 cycle times). Re-start the autotuning process and set a longer cycle time 1CT.		2SP		Channel 2 setpoint may be absolute (2SM=ABS), or a differential relative to setpoint 1 (2SM=REL) Auxiliary output switchover temperature (<i>the next parameter will be 2CH</i>)			
• E3 temperature overrange: check that the error was not caused by a probe malfunction, then decrease 1SP in case of heating control, vice versa increase 1SP in case of refrigerating control and then re-start the process.							
 To eliminate the error indication and return to the normal mode, press button (b). Control improvement 		ABS					
 To reduce overshoot, reduce the integral action reset 1AR To increase the response speed of the system, reduce the proportional band 1PB. Caution: doing this makes the system less stable. 		SSM					
To reduce swings in steady-state temperature, increase the integral action time 1IT; system stability is thus increased, although its response speed is decreased.	H			2SP 2SP+2HY T[°] 2SP-2HY ZSP ON/OFF control in refrigeration ON/OFF control in heating			
 To increase the speed of response to the variations in temperature, increase the derivative action time 1DT. Caution: a high value makes the system sensitive to small variations and it may be a source of instability. 	=NA(0.7.7	10.0 10.00	(2SM=ABS, 2CH=REF) (2SM=ABS, 2CH=HEA)			
RECALIBRATION		2DF	-19.919.9	Temperature differential relative to 1SP. The auxiliary output setpoint is equal to 1SP+2DF			
 Have a precision reference thermometer or a calibrator to hand. Ensure that OS1=0 and SIM=0. Switch the controller off then on again. 		ᇳ					
■ During the auto-test phase, press buttons 👔 + 🏔 and keep them pressed till the controller shows 0AD.		M=F		OFF OFF TSP+2DF+2HY T[°]			
■ With buttons () and (a) select 0AD or SAD: 0AD allows a calibration of 0, inserting a constant correction over the whole scale of measurement. SAD allows a calibration of the top part of the measurement scale with a proportional correction between the allower a sint action.		56		1SP 1SP+2DF 1SP+2DF 1SP			
calibration point and 0. ■ Press (i) to display the value and then use (i) + (i) or (iii) to make the read value coincide with the value measured by the				ON/OFF control in refrigeration. Setpoint 2 relative to setpoint 1 (OAU=THR, 2CH=REF) ON/OFF control in heating. Setpoint 2 relative to setpoint 1 (OAU=THR, 2CH=HEA)			

control (REF) or heating control mode (HEA) for the auxiliary output.					
thermostat 2. With 2HY=0 the auxiliary output always remains off.					
me. has been turned off, it remains inactive for 2T0 minutes regardless of the temperature ed.					
me. has been turned on, it remains active for 2T1 minutes regardless of the temperature ed.					
ut state in case of probe failure.					
d management. verature alarms are inhibited (<i>the following parameter will be SB</i>). es programmed in ALA and AHA represent the real alarm thresholds. es programmed in ALR and AHR are alarm differentials referred to 1SP and 1SP+1HY.					
ALR 1SP 1SP+1HY+AHR 1SP-1HY-ALR 1SP 1SP+AHR					
e alarm with relative thresholds, p control (ATM=REL, 1CH=REF) Temperature alarm with relative thresholds, heating control (ATM=REL, 1CH=HEA).					
ure alarm threshold.					
ure alarm threshold.					
ure alarm differential. e low temperature alarm is excluded.					
ure alarm differential. ne high temperature alarm is excluded.					
alarm temperature warning.					
on enabling.					
election (see table of input specifications).					
AC1-2WT only.					
e value (<i>in the models AC1-2WA… only</i>) minimum value measured by the transmitter (i.e. the value matching 0V).					
ge value (<i>in the models AC1-2WA only</i>) maximum value measured by the transmitter (i.e. the value matching 1V)					
et.					
num temperature (TLO) and maximum temperature (THI) logging.					
own					
ess for PC communication					

TECHNICAL DATA

Power supply AC1-2W...D AC1-2W...E AC1-2W...U

12Vac/dc ±10%, 2W 230Vac±10%, 50/60Hz, 2W 115Vac±10%, 50/60Hz, 2W

 Relay outputs (AC1-2W..R..)

 OUT1
 8(3)A

 OUT2
 8(3)A

 SSR drive (AC1-2W..F..)

 OUT1
 15mA
 12Vdc

 OUT2
 15mA
 12Vdc

Inputs see table of input specifications

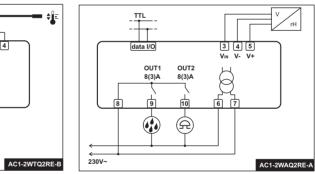
Measurement range see table of input specifications

Measurement accuracy see table of input specifications

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front protection





ONE CHOICE. ots of Options, Just





77х35х77 мм

UNIVERSAL DEFROST CONTROLLER FOR HIGH TEMPERATURE

Selectable Refrigerating or Heating control • Runs on mains power supply • Direct compressor control through high power 16(4)A, 16(5)A or 16(8)A relay • Selectable NTCIOK or PTC probe input • Integrated defrost functions • Auxiliary output configurable in four different operation modes • Absolute or relative temperature alarms • Door open alarm • Automatic condenser maintenance warning • On/Off button • Optional light control button • Quick programming through ZOT-ATI key • Connection to LAE supervisory systems

APPLICATIONS:

AT1-5

Freestanding upright cabinets and counters, cold stores, plug-in display cases, control panels, heated cabinets.

			ALT	-5 Series
	Functions	AS1E-G	BS2E-BG	BS6E-AL
Inputs	thermostat	\checkmark	\checkmark	\checkmark
	evaporator		\checkmark	\checkmark
	door switch		\checkmark	\checkmark
Outputs	thermostat 16(4)A	\checkmark	\checkmark	
	thermostat 16(8)A			\checkmark
	auxiliary 7(2)A		\checkmark	\checkmark
Power supply	230Vac	\checkmark	\checkmark	\checkmark
Serial port	TTL			\checkmark
	RS485		\checkmark	
Kaypad	generic	\checkmark	\checkmark	
	with light button			\checkmark

AT1-5 Series

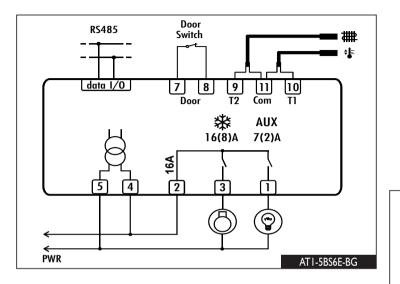
Models with removable screw terminal blocks are available. In this case, the letter "5" of code changes in "Q", ex. ATI-5BQ2E-BG.

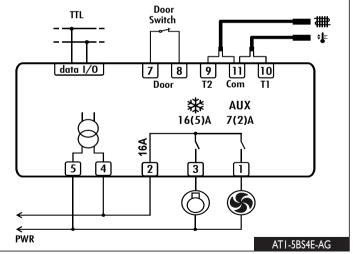
All models come with an alarm buzzer. Versions with 110V power supply are available.

On request, the ATI-5 is also available with gasket for a better protection between bezel and metal panel.



TECHNICAL DATA -50÷120°C,-55÷240°F **Control Range:** Resolution: 01/1°C.°F NTC10K <±0.3°C (-40.0÷70.0°C) Accuracy: PTC1000: <±0.5°C (-50÷120°C) selectable NTC10K or PTC1000 Sensor type: Power supply: 230V~ ±10% 50÷60Hz 3W IP55 Front protection: Panel cut-out: 71x29 mm





Freestanding upright cabinets and counters, cold stores, plug-in display cases, control panels, heated cabinets.



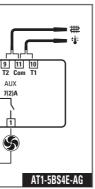


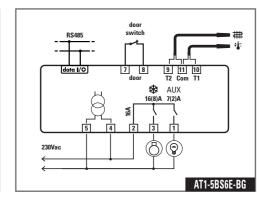
AT1-5 INSTRUCTIONS FOR USE			RANGE	DESCRIPTION	OS1 -12.512.5°C Probe T1 offset.
	installing the instrument, please read these instructions carefully	SCL	1°C; 2°C;	Readout scale. 1°C (only with INP =SN4): measuring range -50/-9.9 19.9/80°C	T2 NO/YES Probe T2 enabling (ev
to ensure maximum performance and safety.	INDICATIONS		°F	2°C : measuring range -55 120°C °F : measuring range -55 240°F	0S2 -12.512.5°C Probe T2 offset.
DESCRIPTION	INDICATIONS			Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to reconfigure the parameters relevant to the	TLD 130 min Delay for minimum
* *	%)⊱ Thermostat output RIZ Auxiliary output			absolute and relative temperatures (SPL, SPH, SP, ALA, AHA, etc)	SIM 0100 Display slowdown.
RL2	Alarm	SPL	-50SPH	Minimum limit for SP setting	ADR 1255 AT1-5 address for P
41as. • • • • • • • • • • • • • • • • • • •		SPH	SPL.120°	Maximum limit for SP setting	ADD 1200 ATT 5 ddd 605 for t
		SP	SPL SPH	Setpoint (value to be maintained in the room).	WIRING DIAGRAM
Fig.1 — Front panel i ◆ Info / Setpoint button.	▲M Increase / manual activation button.	C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode	
Manual defrost / Decrease button.	¥ⓓ Exit / Stand-by button.	HYS	110°	OFF/ON thermostat differential	door TTL switch
disturbance, keep the sensor and signal cables well separate f	ips, by pressingly gently; if fitted, check that the rubber gasket			$ \begin{array}{c} $	detre L/O
 Place the probe T1 inside the room in a point that truly represent the probe T2 where there is the maximum formation 		CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the previous switchover. We recommend to set CRT=03 with HYS<2.0°.	
OPERATION		CT1	030min	Thermostat output run when probe T1 is faulty. With CT1 =0 the output will always remain OFF.	
DISPLAY		CT2	030min	Thermostat output stop when probe T1 is faulty. With CT2 =0 and CT1 >0 the output will always be ON.	
During normal operation, the display shows either the temper DEF Defrost in progress	rature measured or one of the following indications: HI Room high temperature alarm			Example: CT1=4, CT2=6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.	door BS485 switch
REC Recovery after defrost OFF Controller in stand-by	LO Room low temperature alarm E1 Probe T1 failure	CSD	030min	Compressor stop delay after the door has been opened (active only if DS =YES).	
CL Condenser clean warning DO Door open alarm	E2 Probe T2 failure	DFR	0 24(1/24h)	Defrost frequency expressed in cycles/24 hours.	data 1/0 7 8 1 door
		DLI	-50120°	Defrost end temperature.	₩ AUX 16(8)A 7(2)A
INFO MENU The information available in this menu is:		DTO	1120min	Maximum defrost duration.	
T1 Instant probe 1 temperature T2 Instant probe 2 temperature THI Maximum probe 1 temperature recorded	TLO Minimum probe 1 temperature recorded CND Compressor working weeks LOC Keypad state lock	DTY	OFF; ELE; GAS	Defrost type OFF: off cycle defrost (Compressor and Heater OFF). ELE: electric defrost* (Compressor OFF and Heater ON). GAS: hot gas defrost* (Compressor and Heater ON).	
 Access to menu and information displayed. Press and immediately release button 1. With button ▼ or ▲ select the data to be displayed. Press button 1 to display value. To exit from the menu, press button X or wait for 10 second 	ıds.	DDY	060min	 * The defrost output is active if only OAU=DEF. Display during defrost. If DDY=0 during defrost the temperature continues to be displayed. If DDY > 0, during defrost the display shows DEF, when defrost is over REC is displayed during DDY minutes. 	
 Reset of THI, TLO, CND recordings With button ♥ or ▲ select the data to be reset. Display the value with button 1. While keeping button 1 pressed, use button X. 		ATM	NON; ABS; REL	Alarm threshold management. NON: all temperature alarms are inhibited (the following parameter will be ADO). ABS: the values programmed in ALA and AHA represent the real alarm thresholds. REL: the values programmed in ALR and AHR are alarm differentials referred to SP and SP+HY .	
 SETPOINT (display and modification of desired temperations) Press button € for at least half second, to display the setpor By keeping button € pressed, use button ♥ or ▲ to set the maximum SPH limit). When button € is released, the new value is stored. 				OFF	
	r to be put on a standby or output control to be resumed (with	ALA	-50 120°	refrigerating control (ATM=REL, C-H=REF). heating control (ATM=REL, C-H=HEA).	
SB=YES only). KEYPAD LOCK		AHA	-50 120°	High temperature alarm threshold.	
	perations, which might be attempted when the controllers is OC =YES to inhibit all functions of the buttons. To resume normal	ALR	-12 0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.	
operation of keypad, adjust setting so that LOC =NO.			0 12°	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.	
	ary time has elapsed to obtain the defrosting frequency set with	AHR			
to the controller and at each subsequent defrost start. When t	6 hours. The internal timer is set to zero when power is applied the controller is put on a standby, the accumulated time count is	ATD ADO	0 120min 0 30min	Delay before alarm temperature warning. Delay before door open alarm warning.	
"frozen" (is not incremented). Manual defrost. Defrosting may also be induced manually b	y keeping the button 働 pressed for 2 seconds.		052	Condenser periodic cleaning. When the compressor operation time, expressed in weeks, matches the ACC value	
Defrost type. Once defrost has started, Compressor and Defr OAU . The AUX output is associated to defrost function with C	rost outputs are controlled according to the parameters DTY and DAU- DFF exclusively.	ACC	weeks	programmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is disabled.	
. –	but, if the evaporator probe has been enabled (T2 =YES) and	SB	NO/YES	Stand-by button enabling 🖾.	
temperature DLI is achieved before this time elapses, defrost Caution: if C-H =HEA all defrost functions are inhibited; if DFR =	will be terminated in advance. =0 the timed defrost function is excluded; during defrost, the high	DS	NO/YES	Door switch input enabling (closed when door is closed).	
temperature alarm is inhibited.		UAU	NON; 0-1; DEF; LGT;	AUX output operation NON : output disabled (always off). 0-1 : the relay contacts follow the on/standby state of controller. DEF: output programmed for defrost control.	
 The setup menu is accessed by pressing button X+1 for With button or a select the parameter to be modified. 	5 seconds.		ALR;	LGT : output enabled for light control. ALR : contacts make when an alarm condition occurs.	
 Press button i to display the value. By keeping button i pressed, use button or i to set th When button is released, the newly programmed value is To exit from the setup, press button i or wait for 30 second 	s stored and the following parameter is displayed.	INP	SN4; ST1	Temperature sensor selection. With INP = SN4, the probes must be the LAE models SN4; with INP = ST1, the probes must be the LAE models ST1	

g (evaporator).

num temperature (TLO) and maximum temperature (THI) logging.

for PC communication.





TECHNICAL DATA

Power supply

AT1-5E	
AT1-5U	
AT1-5D	

Relay outputs AT1-5.01(2)... compressor 12(4)A AT1-5.S1(2)... compressor 16(4)A AT1-5.03(4)... compressor 12(5)A AT1-5.S3(4)... compressor 16(5)A AT1-5.05(6)... compressor 12(8)A AT1-5.S5(6)... compressor 16(8)A Auxiliary loads 7(2)A 240vac

230Vac±10%, 50/60Hz, 3W 115Vac±10%, 50/60Hz, 3W 12Vac±10%, 50/60Hz, 3W

AT1-5.**0**... maximum total current 12A AT1-5.**S**... maximum total current 16A

 $\label{eq:linear} \begin{array}{ll} \mbox{Inputs} \\ \mbox{NTC 10K} \Omega @ 25^{\circ} C, & LAE \mbox{ part No. SN4...} \\ \mbox{PTC 1000} \Omega @ 25^{\circ} C, & LAE \mbox{ part No. ST1...} \end{array}$

Measuring Range -50...120°C, -55...240°F -50/-9.9 ... 19.9/80°C (with NTC10K only)

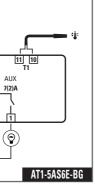
Measuring accuracy <0.5°C within the measurement range

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE – UL (Approvals and Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B);

EN50082-1 UL 60730-1A

Front protection IP55





VIA PADOVA, 25 31046 ODERZO /TV /ITALY TEL. +39 - 0422 815320 FAX +39 - 0422 814073 www.lae-electronic.com E-mail: sales@lae-electronic.com

Universal Defrost Controller for High and Low Temperature

Selectable Refrigerating or Heating control

Runs on mains power supply

Direct compressor control through high power 16(5)A

Excellent evaporator fan control

Auxiliary output configurable in six different operating modes

Selectable NTCIOK or PTC input

Electrical, off cycle or hot gas defrost

Automatic condenser maintenance warning

On/Off button

Optional light control button

Quick programming through ZOT-AT2 key

APPLICATIONS:

High or Low Temperature upright cabinets and counters, cold stores, plug-in display cases, control panels, heated cabinets.

			AT2	-5 Series
	Functions	BS4E-G	BS4E-AG	BS4E-AL
Inputs	thermostat	\checkmark	\checkmark	\checkmark
	evaporator	\checkmark	\checkmark	\checkmark
	door switch	\checkmark	\checkmark	\checkmark
Outputs	thermostat	\checkmark	\checkmark	\checkmark
	evaporator fans	\checkmark	\checkmark	\checkmark
	auxiliary	\checkmark	\checkmark	\checkmark
Power supply	230Vac	\checkmark	\checkmark	\checkmark
Serial port	serial port TTL		\checkmark	\checkmark
Keypad	generic	\checkmark	\checkmark	
	with light button			\checkmark

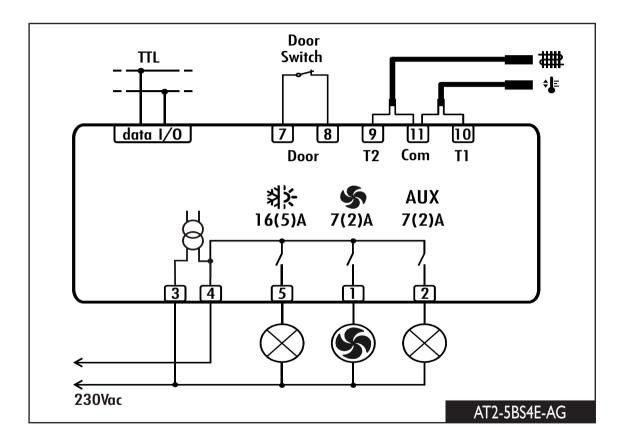
Models with removable screw terminal blocks are available. In this case, the letter "S" of code changes in "Q", ex. AT2-5BQ4E-AL.

All models come with an alarm buzzer. Versions with 110V power supply are available. Upon request, against large batches, the AT2-5 is also available with RS485 serial port On request, the AT2-5 is also available with gasket for a better protection between bezel and metal panel.



TECHNICAL DATA

Control Range:		-50÷120°C, -55÷240°F
Resolution:		0.1 / 1 °C; °F
Accuracy:	NTC10K:	<±0.3°C (-40.0÷70.0°C)
-	PTC1000:	<±0.5°C (-50÷120°C)
Sensor type:		selectable NTC10K or PTC1000
Power supply:		230V~ ±10% 50÷60Hz 3W
Front protection:		IP55
Panel cut-out:		71x29 mm



APPLICATIONS

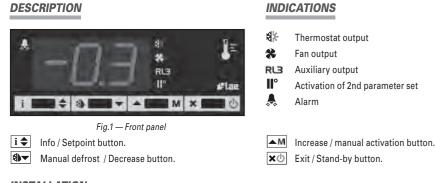


High or Low Temperature upright cabinets and counters, cold stores, plug-in display cases, control panels, heated cabinets.



AT2-5 INSTRUCTIONS FOR USE

Thank you for having chosen a LAE electronic product. Before installing the instrument, please read these instructions carefully to ensure maximum performance and safety.



INSTALLATION

Insert the controller through a hole measuring 71x29 mm.

• Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic disturbance, keep the sensor and signal cables well separate from the power wires.

Fix the controller to the panel by means of the suitable clips, by pressingly gently; if fitted, check that the rubber gasket

- adheres to the panel perfectly, in order to prevent debris and moisture infiltration to the back of the instrument.

 Place the probe T1 inside the room in a point that truly represents the temperature of the stored product.
- Place the probe T2 on the evaporator where there is the maximum formation of frost.

OPERATION

DISPLAY

During normal operation, the display shows either the temperature measured or one of the following indications:

. 0			J
DEF	Defrost in progress	HI	Room high temperature alarm
REC	Recovery after defrost	LO	Room low temperature alarm
OFF	Controller in stand-by	E1	Probe T1 failure
CL	Condenser clean warning	E2	Probe T2 failure

UL	Condenser clean warning	EZ	1
DO	Door open alarm		

INFO MENU

 The information available in this menu is:

 T1
 Instant probe 1 temperature

 T2
 Instant probe 2 temperature

 CND
 Compressor working weeks

 THI
 Maximum probe 1 temperature recorded
 LOC
 Keypad state lock

Access to menu and information displayed.

Press and immediately release button i.

- With button 🔽 or 🔺 select the data to be displayed.
- Press button i to display value.

■ To exit from the menu, press button 🗵 or wait for 10 seconds.

Reset of THI, TLO, CND recordings

- With button or select the data to be reset.
- Display the value with button i.
- While keeping button \square pressed, use button \boxtimes .

SETPOINT (display and modification of desired temperature value)

Press button for at least half second, to display the setpoint value.

■ By keeping button 🔄 pressed, use button 💌 or 🔺 to set the desired value (adjustment is within the minimum SPL and the
maximum SPH limit).
■ When button 🗲 is released the new value is stored

■ When button I is released, the new value is store

STAND-BY

Button , when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with **SB**=YES only).

KEYPAD LOCK

The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controllers is operating in a public place. In the INFO menu, set parameter **LOC**=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that **LOC**=NO.

SELECTION OF SECOND PARAMETER GROUP

It's possible to select control parameters between two different pre-programmed groups, in order for the fundamental control parameters to be adapted quickly to changing needs. With **IISM**=MAN, changeover from Group I to Group II takes place manually by pressing button 🔽 for 2 seconds. The activation of Group II is signalled by the lighting up of the relevant LED on the controller display. If **IISM**=NON, switchover to group II is inhibited.

DEFROST

Timed defrost. Defrosting starts automatically when necessary time has elapsed to obtain the defrosting frequency set with **DFR (IIDF)**. For example, with **DFR=**4 defrosting occurs once every 6 hours. The internal timer is set to zero when power is applied to the controller and at each subsequent defrost start. When the controller is put on a standby, the accumulated time count is "frozen" (is not incremented).

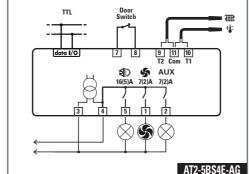
Manual defrost. Defrosting may also be induced manually by keeping the button 🔊 pressed for 2 seconds.

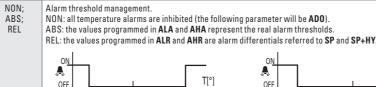
Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to the parameters **DTY** and **OAU**. The AUX output is associated to defrost function with <u>**OAU**=DEF exclusively</u>. If **FID**=YES the evaporator fans are active all through defrost.

Defrost termination. Defrost lasts as long as time **DTO** but, if the evaporator probe has been enabled (**T2**=YES) and temperature **DLI** is achieved before this time elapses, defrost will be terminated in advance.

Resuming thermostatic cycle. When defrost is over, if **DRN** is greater than 0, all outputs will remain off for **DRN** minutes, in order for the ice to melt completely and the resulting water to drain. Moreover, if probe T2 is active (**T2**=YES), the fans will re-start when the evaporator gets to a temperature lower than **FDD**; Vice versa, if such condition does not occur after 4 minutes following defrost termination, the fans will be switched on anyway.

	: if C-H =HEA a ature alarm is i	all defrost functions are inhibited; if DFR =0 the timed defrost function is excluded; during defrost, the high inhibited.	ALA	-50 120°	Low temperature ala
		N PARAMETERS	AHA	-50 120°	High temperature ala
		accessed by pressing button 🗵+🔟 for 5 seconds.	ALR	-12 0°	Low temperature ala
Press	button i to	▲ select the parameter to be modified. display the value.	AHR	0 12°	High temperature ala
Wher	button i is	I pressed, use button ▼ or ▲ to set the desired value. released, the newly programmed value is stored and the following parameter is displayed.	ATD	0 120min	Delay before alarm to
		up, press button 🗵 or wait for 30 seconds.	ADO	0 30min	Delay before door op
PAR	RANGE	DESCRIPTION	ACC	052 weeks	Condenser periodic programmed, "CL" fl
SCL	1°C; 2°C; °F	Readout scale. 1°C (only with INP=SN4): measuring range -50/-9.9 19.9/80°C 2°C: measuring range -50 120°C °F: measuring range -55 240°F Coutions when sharping the SCI value it is then should take according to second forms the parameters relevant to the	IISM	NON; MAN;	Switchover mode to NON: inhibition to us MAN: button M swit
		Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to reconfigure the parameters relevant to the absolute and relative temperatures (SPL, SPH, SP, ALA, AHA, etc)	IISL	-50IISH	Minimum limit for IIS
SPL	-50SPH	Minimum limit for SP setting	IISH	IISL120°C	Maximum limit for IIS
SPH	SPL.120°	Maximum limit for SP setting	IISP	IISL IISH	Setpoint in mode 2
SP	SPL SPH	Setpoint (value to be maintained in the room).	IIHY	110°	OFF/ON differential i
C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode	IIFT	N0/YES	Optimised fan contro
HYS	110°	OFF/ON thermostat differential	IIDF	099hours	Defrost timer set to s
			SB	N0/YES	Stand-by button ena
		OFF OFF SP	DS	NO/YES	Door switch input en
		Refrigerating control (C-H=REF) Heating control (C-H=HEA)			
CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the previous switchover. We recommend to set CRT=03 with HYS<2.0°.	LSM	NON; MAN; DOR	Light control mode NON : light output no MAN : light ouput co DOR : light ouput swi
CT1	030min	Thermostat output run when probe T1 is faulty. With CT1 =0 the output will always remain OFF.	OAU	NON;	AUX output operatio NON : output disable
CT2	030min	Thermostat output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON. Example: CT1=4, CT2=6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.		0-1; DEF; LGT; AL0;	0-1 : the relay contac DEF : output program LGT : output enabled
CSD	030min	Compressor stop delay after the door has been opened (active only if DS =YES).		AL1	ALO : contacts open AL1 : contacts make
DFR	024(1/24h)	Defrost frequency expressed in cycles/24 hours.	INP	SN4; ST1	Temperature sensor
DLI	-50120°	Defrost end temperature.			must be the LAE mod
DTO	1120min	Maximum defrost duration.	0\$1	-12.512.5°C	Probe T1 offset.
DTY	OFF; ELE;	Defrost type OFF: off cycle defrost (Compressor and Heater OFF).	T2	NO/YES	Probe T2 enabling (e
	GAS	ELE: electric defrost* (Compressor OFF and Heater ON). GAS: hot gas defrost* (Compressor and Heater ON).	0S2	-12.512.5°C	Probe T2 offset.
		* The defrost output is active if only OAU =DEF.	TLD	130 min	Delay for minimum
DRN	030min	Pause after defrost (evaporator drain down time).	SIM	0100	Display slowdown
DDY	060min	Display during defrost. If DDY = 0 during defrost the temperature continues to be displayed. If DDY > 0, during defrost the display shows DEF, and at the end of defrost it shows REC for DDY minutes.	ADR	1255	AT2-5 address for I
FID	NO/YES	Fans active during defrost.	L		
FDD	-50120°	Evaporator fan re-start temperature after defrost.	WIRIN	IG DIAGRA	М
FTC	NO/YES	Optimised fan control enabling. With FTC = NO the fans remain on all the time CMP ON CMP OFF CMP ON CMP OFF CMP ON CMP			Boor Switch





SP+HYS+AHR

H FI

Fan stop delay after compressor stop. See Fig. 2.

SP

Temperature alarm with relative thresholds

refrigerating control (ATM=REL, C-H=REF)

SP-ALR

Timed fan stop. With **FT2**=0 the fans remain on all the time.

Timed fan run. With **FT3**=0, and **FT2** > 0, the fans remain off all the time.

0...180sec

0...30min

0...30min

FT1

FT2

FT3

ATM

FT2 FT3 FT2 FT3

Fig. 2 Optimised fan control (FTC=YES)



Temperature alarm with relative thresholds, heating control (**ATM**=REL, **C-H**=HEA). rm threshold.

rm threshold.

rm differential. With **ALR**=0 the low temperature alarm is excluded.

arm differential. With **AHR**=0 the high temperature alarm is excluded.

emperature warning.

pen alarm warning.

cleaning. When the compressor operation time, expressed in weeks, matches the **ACC** value flashes in the display. With **ACC**=0 the condenser cleaning warning is disabled.

second parameter set se the second parameter group (the following parameter will be **SB**). itches the two parameter groups over.

SP setting.

SP setting.

n mode 2.

ol enabling in mode 2.

start a defrost in mode 2.

bling 🙂.

abling (closed when door is closed).

ot controlled. ontrolled through button 💹 (if **OAU**=LGT). itched on when door is opened (if **OAU**=LGT)

nn. ed (always off). cts follow the on/standby state of controller nmed for defrost control. f for light control. when an alarm condition occurs.

when an alarm condition occurs.

selection. With **INP** = SN4, the probes must be the LAE models SN4..; with **INP** = ST1, the probes dels ST1...

vaporator).

n temperature (TLO) and maximum temperature (THI) logging.

PC communication.

TECHNICAL DATA

Power supply

AT2-5...E AT2-5...U AT2-5...D 230Vac±10%, 50/60Hz, 3W 115Vac±10%, 50/60Hz, 3W 12Vac/dc±10%, 3W

Relay outputs

AT2-5.0... Compressor 12(5)A 240vac AT2-5.S... Compressor 16(5)A 240vac Evaporator fans 7(2)A 240vac Auxiliary loads 7(2)A 240vac

AT2-5.**0**... maximum total current 12A AT2-5.**S**... maximum total current 16A

Inputs NTC 10KΩ@25°C, LAE part No. SN4...

PTC 1000Ω@25°C, LAE part No. ST1..

Measurement Range -50...120°C, -55...240°F -50/-9.9...19.9/80°C (NTC10K only)

Measurement accuracy <0.5°C within the measurement range

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE – UL (Approvals and Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1 UL 60730-1A

Front protection



VIA PADOVA, 25 31046 ODERZO /TV /ITALY TEL. +39 - 0422 815320 FAX +39 - 0422 814073 www.lae-electronic.com E-mail: sales@lae-electronic.com DEFROST CONTROLLER FOR DISPLAY CASES AND COLD STORES

77x35x90 MM

Cyclic defrosts • Synchronized defrost start and termination with master-slave connection • Selectable NTCIOK or PTC input • FLEXICOLD function for energy saving or alternative setpoint • Direct compressor control through high power 12(5)A relay • Optional control of a second compressor or evaporator • Excellent evaporator fan control • Absolute or relative temperature alarms, door open alarm, condenser high temperature/pressure alarm • Light and standby control (On/Off) • Quick programming through ZOT-AD2 • Connection to LAE supervisory systems

APPLICATIONS:

AD2-5

Plug-in cabinets, supermarket display cases, cold stores, control panels, upright fridges and freezers, refrigerated tables.

	Functions	B14D-AL	B23W-AG	C34W-BG
Temperature	thermostat	\checkmark	\checkmark	\checkmark
Inputs	evaporator	\checkmark	\checkmark	\checkmark
	auxiliary			\checkmark
Door switch input	Voltage free contact	\checkmark	\checkmark	\checkmark
Digital inputs	Voltage free contact	\checkmark		
5	12÷24Vac voltage		\checkmark	
	Defrost synchronisation			\checkmark
Outputs	thermostat	\checkmark	\checkmark	\checkmark
outputs	evaporator fans	\checkmark	\checkmark	\checkmark
	defrost	\checkmark	\checkmark	\checkmark
	auxiliary	\checkmark		\checkmark
Power supply	115-230Vac		\checkmark	\checkmark
	12Vac/dc	\checkmark		
Serial port	TTL serial port	\checkmark	\checkmark	
	RS485 serial port			\checkmark
Kaypad	generic		\checkmark	\checkmark
	with light button	\checkmark		

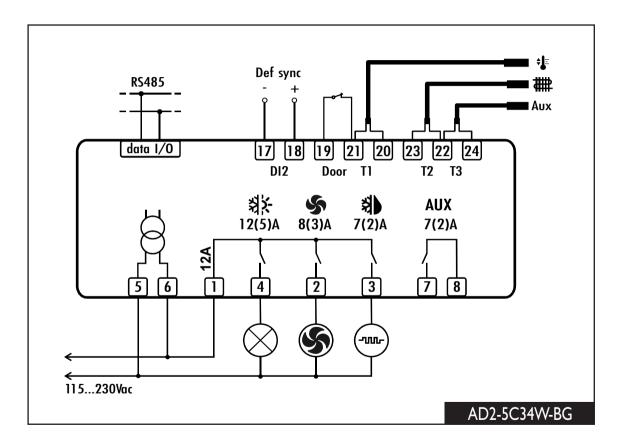
AD2-5 Series

TECHNICAL DATA

Control Range:		-50÷120°C , -55÷240°F
Resolution:		0.1 / 1 °C; °F
Accuracy:	NTC10K:	<±0.3°C (-40.0÷70.0°C)
	PTC1000:	<±0.5°C (-50÷120°C)
Sensor type:		selectable NTC10K or PTC1000
Power supply:		115÷230V~ ±10% 50÷60Hz 3W
Front protection:		IP55
Panel cut-out:		71x29 mm

S OF CARE

All models come with an alarm buzzer. All models are fitted with detachable screw terminals. On request, the AD2-5 is also available with gasket for a better protection between bezel and metal panel.



APPLICATIONS



Plug-in cabinets, supermarket display cases, cold stores, control panels, upright fridges and freezers, refrigerated tables.



AD2-5 INSTRI	JCTIONS FOR USE	PAR	RANGE	DESCRIPTION	AHT	-50120°	Condensation tempera
	pre installing the instrument, please read this instruction booklet	SCL	1°C;	Readout scale.	ACC	052	Condenser periodic cl
carefully in order to ensure safe installation and optimum perform	mance.		2°C; °F	1°C (with INP=SN4 only): measuring range -50/-9.9 19.9/80°C 2°C : measuring range -50 120°C		weeks	ACC value programm disabled and CND disa
DESCRIPTION	INDICATIONS			°F : measuring range -55 240°F	IISM	NON;	Switchover mode to se
	Thermostat output			Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to re-configure the parameters relevant to the absolute and relative temperatures (SPL, SPH, SP, ALA, AHA, etc).		MAN; HDD;	NON : inhibition to use MAN : button M switc
	🗱 Fan output	SPL	-50SPH	Minimum limit for SP setting.		DI2	HDD : automatic switch DI2 : switchover to the
	Defrost output	SPH	SPL120°	Maximum limit for SP setting.	IISL	-50 IISH	Minimum limit for IISP
i → (1) → → → → → → → →	Activation of 2nd parameter set	SP	SPL SPH	Setpoint (value to be maintained in the room).	IISH	IISL 120°	Maximum limit for IISP
Fig.1 - Front panel	🌲 Alarm	C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode.	IISP	IISL IISH	Setpoint in mode 2.
i Info / Setpoint button.	Manual activation / Increase button.	HYS	110°	OFF/ON thermostat differential.	IIHY	1 10°	OFF/ON differential in
Manual defrost / Decrease button.	Exit / Stand-by button.				IIFC	NON;TMP;	Fan control in mode 2.
INSTALLATION					HDS	TIM 15	Controller sensitivity for t
 Insert the controller through a hole measuring 71x29 mm. 	work "			SP SP+HYS T[°] SP-HYS SP T[°]	lidf	099 hours	Time interval among de
disturbance, keep the sensor and signal cables well separate fro				Refrigerating control (C-H=REF) Heating control (C-H=HEA)	SB	NO/YES	Stand-by button (0) en
 Fix the controller to the panel by means of the suitable clips, b to the panel perfectly, in order to prevent debris and moisture in: 	by pressingly gently; if fitted, check that the rubber gasket adheres filtration to the back of the instrument.	CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the previous switchover. We recommend to set CRT=03 with HYS<2.0°.	DS	NO/YES	Door switch input enal
 Place the probe T1 inside the room in a point that truly repres Place the probe T2 on the evaporator where there is the max 	sents the temperature of the stored product.	CT1	030min	Thermostat output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.	DI2	NON;	DI2 digital input operat
The function of probe T3 is determined by the parameter T3. V	Vith T3= DSP the probe measures the temperature to be displayed.	CT2	030min	Thermostat output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON.		HPS;	NON : digital input 2 n
	, it must therefore be placed between the fins of the condensing second evaporator and it must therefore be placed where there is	000	0.20min	Example: CT1=4, CT2= 6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.		IISM; RDS;	HPS : when contact op IISM : when contact m
the maximum formation of frost. With T3=NON, the third probe i	s disabled.	CSD		Compressor stop delay after the door has been opened (active only if DS=YES). Defrost start mode		DSY	RDS : when contact m DSY : defrost synchror
OPERATION		DFM	TIM;	NON : defrost function is disabled (the following parameter will be FID).			The first controller in d
DISPLAY During normal operation, the display shows either the temperatu	ure measured or one of the following indications:		FRO	TIM : regular time defrost. FRO : the defrost time count is only increased when the conditions occur for frost to form on the	LSM	NON;	get defrost of all the ot Light control mode
dEF Defrost in progress	hP Condenser high pressure alarm			evaporator (optimised time increase).	LOW	MAN;	NON : light output not
CFF Controller in stand-by	μ, Room high temperature alarm	DFT	099 hours			DOR	MAN : light ouput cont DOR : light ouput swite
Door open alarm	F / Probe T1 failure	DFB	NO/YES	Defrost timer backup. With DFB=YES, after a power interruption, the timer resumes the count from where it was left off with ±30 min. approximation. With DFB=NO, after a power interruption, the defrost timer will	OA1	NON;	AUX output operation
hc Condenser high temperature alarm	F Probe T2 failure F Probe T3 failure			re-start to count from zero.		0-1; LGT;	NON : output disabled 0-1 : the relay contacts
		DLI	-50120°	Defrost end temperature. Maximum defrost duration.		2CU; 2EU;	LGT : output enabled
The information available in this menu is:		DTO DTY	OFF;	Defrost type		AL0;	2CU : output programmer 2EU : output enabled f
$\frac{1}{2}$ Instant probe 1 temperature	Lh Maximum probe 1 temperature recorded Lh Minimum probe 1 temperature recorded		ELE;	OFF: off cycle defrost (Compressor and Heater OFF).		AL1	AL0 : contacts open w AL1 : contacts make v
<i>E</i> 3 * Instant probe 3 temperature	cnd ** Compressor working weeks		GAS	ELE: electric defrost (Compressor OFF and Heater ON). GAS: hot gas defrost (Compressor and Heater ON).	2CD	0120 sec	Auxiliary compressor
*: displayed only if enabled (see §Configuration Parameters) **:	Loc Keypad state lock	DPD	0240sec	Evaporator pump down. At the beginning of defrost, defrost outputs (determined by DTY) are OFF for DPD seconds.	INP	SN4; ST1	seconds after the main Temperature sensor s
Access to menu and information displayed.	SETPOINT : display and modification	DRN	030min	Pause after defrost (evaporator drain down time).			ST1, the probes must
Press and immediately release button i.	Press button i for at least half second, to display the	DDM	RT;	Defrost display mode. During defrost the display will show:	OS1		Probe T1 offset.
 With button () or () select the data to be displayed. Press button () to display value. 	setpoint value. ■ By keeping button (i) pressed, use button () or (▲) to set the		LT; SP:	RT: the real temperature; LT : the last temperature before defrost;	T2	NO/YES	Probe T2 enabling (ev
To exit from the menu, press button X or wait for 10 seconds Reset of THI, TLO, CND recordings	 desired value (adjustment is within the minimum SPL and the maximum SPH limit). 		DEF	SP : the current setpoint value;	OS2 T3		Probe T2 offset. Auxiliary probe T3 ope
With button v or select the data to be reset.	 When button is released, the new value is stored. 	DDY	060min	DEF : "dEF".	13	DSP;	NON : probe T3 not fit
 Display the value with button (i). While keeping button (i) pressed, use button (x). 				DDY minutes after defrost termination.		CND; 2EU	DSP : temperature T3 CND : condenser temp
STAND-BY		FID	NO/YES	Fans active during defrost.			2EU : second evapora
	ut on a standby or output control to be resumed (with SB =YES only).	FDD	-50120°	Evaporator fan re-start temperature after defrost. Maximum evaporator fan stop after defrost.	OS3 TLD	-12.512.5°C 130 min	Probe 3 offset. Delay for minimum ten
KEYPAD LOCK		FTO FCM		Fan mode during thermostatic control.	SIM	0100	Display slowdown.
	tions, which might be attempted when the controller is operating in inhibit all functions of the buttons. To resume normal operation of		TMP;	NON : The fans remain ON all the time;	ADR	1255	AD2-5 address for PC
keypad, adjust setting so that LOC=NO.			TIM	TMP : Temperature-based control. The fans are ON when the compressor is ON. When the compressor is turned OFF, the fans remain ON as long as the temperature difference Te-Ta is greater than FDT. The	, and the second		
SELECTION OF SECOND PARAMETER GROUP				fans are turned ON again with FDH differential. (Te = Evaporator temperature, Ta = Air temperature); TIM : Timed-based control. The fans are	W/IDI	NG DIAG	DVWS
	nt pre-programmed groups, in order for the fundamental control eover from Group I to Group II (and vice versa) may take place			ON when the compressor is ON. When the compressor is OFF, the fans switch ON and ON COMPR. COMPR. COMPR. COMPR. COMPR.			I AMO
	N), or AUTOMATICALLY when heavy duty conditions are detected PUT DI2 is activated (the activation of DI2 selects Group II). If			OFF according to parameteres FT1, FT2,			
IISM=NON, switchover to Group II is inhibited. The activation of	Group II is signalled by the lighting up of the relevant LED on the			FT3 (See Fig.2).	remote	- + • data 17 18	19 21 20 23 22 24
controller display.				Fig.2 Time-optimised fan control (FCM=TIM) IIII FT2 FT3 FT2 FT3	AD2-5	C34W-BG	Door T2 T1 T3
DEFROST Automatic defrost. Defrost starts automatically as soon as the	time set with parameter DFT has elapsed.	FDT	-1200°	Evaporator-Air temperature difference for the fans to turn OFF after the compressor has stopped.	8		
	intervals when the timer reaches the value of DFT. For example,	FDH	1120°	Temperature differential for fan re-start. Example: FDT = -1, FDH=3. In this case, after the compressor has stopped, the fans are OFF when Te	L S C		
 Optimized defrost. With DFM=FRO the timer is only increased 	when the conditions occur for frost to form on the evaporator, until			> Ta - 1 (FDT), whereas the fans are ON when Te < Ta - 4 (FDT-FDH).			Fig.3 Connectio
climatic conditions. With setpoints much lower than 0°C, defrost		FT1	0180sec	Fan stop delay after compressor stop. See Fig. 2			
	s (models AD2-5x3xxx only) are linked to each other as per Fig. . The first controller which will start defrost, will also get all other	FT2	030min	Timed fan stop. With FT2=0 the fans remain on all the time.			RS485
controllers synchronised.	-	FT3	030min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.			
the power interruption. Vice versa, with DFB=NO, the time count	lefrost timer resumes the time count from where it was left off before re-starts from 0. In stand-by, the accumulated time count is frozen.	ATM	NON; ABS;	Alarm threshold management. NON : all temperature alarms are inhibited (the following parameter will be ADO).			data I/O
Manual or remote defrost start. It's possible to manually start started remotely, if DI2=RDS, through the making of the auxiliar	a defrost, by pressing button () for 2 seconds, or defrost may be v contact DI2.		REL	ABS : the values programmed in ALA and AHA represent the real alarm thresholds.			
Defrost type . Once defrost has started, Compressor and Defrost the evaporator fans are active during defrost.	st outputs are controlled according to parameter DTY . If FID =YES,			REL : the values programmed in ALR and AHR are alarm differentials referred to SP and SP+HYS. ON ON ON			Ц Ц д
Defrost termination. The actual defrost duration is influenced by							
as time DTO .	aporator temperature is not monitored and defrost will last as long			OFF T[°] OFF T[°] SP-ALR SP SP+HYS-AHR SP-HYS-ALR SP SP+AHR			
Temperature monitoring of one evaporator: T2 = YES and T3 temperature DLI before the time DTO elapses, defrost will be te	3 different from 2EU. In this case, if the sensor T2 measures the rminated in advance.			Temperature alarm with relative thresholds, Temperature alarm with relative thresholds,			
Temperature monitoring of two evaporators: T2 = YES, T3 = 2	EU, OA1 = 2EU. This function is for the control of two independent porator which gets to temperature DLI first, waiting for the second		E0 120°	refrigerating control (ATM=REL, C-H=REF). heating control (ATM=REL, C-H=HEA).			
evaporator to get to that temperature before the time DTO elaps	Ses.	ALA		Low temperature alarm threshold.			
	is greater than 0, all outputs will remain off for DRN minutes, in ain. Moreover, if probe T2 is active (T2 =YES), the fans will re-start	AHA		High temperature alarm threshold.			115230Vac
	rice versa, if probe T2 is not active (T2=NO) or after defrost has the FTO, after FTO minutes have elapsed the fans will be switched	ALR	-12 0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.			
on anyway.	·	AHR		High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.			
Caution: if DFM = NON or C-H = HEA all defrost functions an During a high pressure alarm, defrost is suspended. During defi	e inhibited; if DFT = 0, automatic defrost functions are excluded. rost, high temperature alarm is bypassed.	ATI	T1; T2; T3	Probe used for temperature alarm detection.			
CONFIGURATION PARAMETERS		ATD	0 120min	Delay before alarm temperature warning.			
		ADO		Delay before door open alarm warning.			
 To get access to the parameter configuration menu, press but With button () select the parameter to be modified. 	tton $(\underline{0})$ + (\underline{i}) for 5 seconds.	AHM	NON; ALR;	Operation in case of high condenser alarm NON : high condenser alarm inhibited.			
 Press button [] to display the value. By keeping button [] pressed, use button () or () to set the 	desired value		STP;	ALR : In case of alarm, "HC" flashes in the display and the buzzer is switched on. STP : in addition to the alarm symbols displayed, the compressor is stopped and defrosts are suspended.			
 By keeping button (i) pressed, use button (ii) of (iii) to set in ei) When button (i) is released, the newly programmed value is a To exit from the setup, press button (iii) or wait for 30 seconds 	stored and the following parameter is displayed.	L		•••• ••• audition to the alarm symbols displayed, the completion is stopped, and denosis are suspended.			

nperature alarm (referred to T3 probe).

dic cleaning. When the compressor operation time, expressed in weeks, matches the rammed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is D disappears from Info Menu.

e to second parameter set to use the following parameter will be SB).

switches the two parameter groups over. witchover to the second parameter group, when heavy duty conditions are detected. o the second parameter group when the auxiliary DI2 input makes.

IISP setting.

IISP setting.

ial in mode 2.

de 2. See FCM.

y for the automatic switchover from Group I to Group II (1=minimum, 5=maximum).

ng defrosts in mode 2.

🕑 enabling.

enabling (closed when door is closed).

peration It 2 not active.

act opens a condensing unit high pressure alarm occurs. act makes the controller will use group 2 parameters.

act makes a defrost is started (remote control). act makes a defrost is started (remote control).

in defrost will get defrost of all the others started. The last controller ending defrost will the others stopped.

t not controlled. t controlled through button (M) (if OA1 = LGT). t switched on when door is opened (if OA1 = LGT).

abled (always off). ntacts follow the on/standby state of controller.

bled for light control. grammed for the control of an auxiliary compressor.

bled for the control of the electrical defrost of a second evaporator.

pen when an alarm condition occurs. ake when an alarm condition occurs.

ssor start delay. If OA1 = 2CU the auxiliary output is switched on with a delay of 2CD e main compressor has cut-in. Both compressors are turned off at the same time. sor selection. With INP=SN4, the probes must be the LAE models SN4..; with INP = nust be the LAE models ST1.

(evaporator).

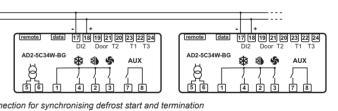
3 operation

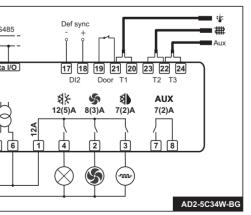
not fitted. re T3 to be displayed.

r temperature measurement. aporator temperature measurement.

m temperature (TLO) and maximum temperature (THI) logging.

r PC communication.





TECHNICAL DATA

Power supply AD2-5....D AD2-5....W

Relay output Compresso Evap. Fan Defrost Auxiliary loads

Input NTC 10KΩ@25°C PTC 1000Ω@25°C

LAE Part No. SN4... LAE Part No. ST1...

Measurement Range -50...120°C, -55...240°F -50 / -9.9 ... 19.9 / 80°C (NTC10K only)

Measurement accuracy <0.5°C within the measurement range

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Reference norms)

EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1



12Vac/dc ±10%, 3W 110 - 230Vac±10%, 50/60Hz, 3W

12(5)A 240Vac 8(3)A 240Vac 7(2)A 240Vac 7(2)A 240Vac

DEFROST CONTROLLER WITH RTC FOR DISPLAY CASES AND COLD STORES

Up to 6 real time defrosts • Synchronized defrost start and termination with master-slave connection • Selectable NTCIOK or PTC input • FLEXICOLD function for energy saving or alternative setpoint • Direct compressor control through high power 12(5)A relay • Optional control of a second compressor or evaporator • Excellent evaporator fan control • Absolute or relative temperature alarms, door open alarm, condenser high temperature/ pressure alarm • Light and standby control (On/Off) • Quick programming through ZOT-AR2 • Connection to LAE supervisory systems

APPLICATIONS:

Plug-in cabinets, supermarket display cases, cold stores, control panels, upright fridges and freezers, refrigerated tables and all those plants where real time defrost starts are needed.

	Functions	B14D-AL	B23W-AG	C34W-BG
Temperature	Thermostat	\checkmark	\checkmark	\checkmark
Inputs	Evaporator	\checkmark	\checkmark	\checkmark
	Auxiliary			\checkmark
Door switch input	Voltage free contact	\checkmark	\checkmark	\checkmark
Digital inputs	Voltage free contact	\checkmark		
	12÷24Vac voltage		\checkmark	
	Defrost synchronisation			\checkmark
Outputs	Thermostat	\checkmark	\checkmark	\checkmark
	Evaporator fans	\checkmark	\checkmark	\checkmark
	Defrost	\checkmark	\checkmark	\checkmark
	Auxiliary	\checkmark		\checkmark
Power supply	115-230Vac		\checkmark	\checkmark
	12Vac/dc	\checkmark		
Serial port	Serial port TTL	\checkmark	\checkmark	
	Serial port RS485			\checkmark
Keypad	Generic		\checkmark	\checkmark
	With light button	\checkmark		

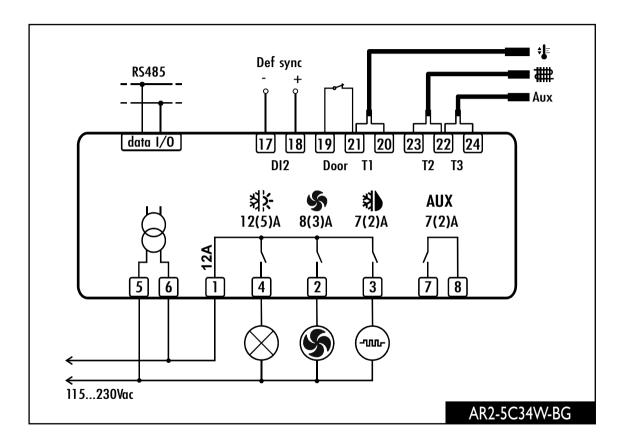
AR2-5 Series

All models come with an alarm buzzer; All models are fitted with detachable screw terminals. On request, the AR2-5 is also available with gasket for a better protection between bezel and metal panel.



TECHNICAL DATA

Control Range:		-50÷120°C, -55÷240°F
Resolution:		0.1 / 1 °C; °F
Accuracy:	NTC10K:	<±0.3°C (-40.0÷70.0°C)
	PTC1000:	<±0.5°C (-50÷120°C)
Sensor type:		selectable NTC10K or PTC1000
Power supply:		115÷230V~ ±10% 50÷60Hz 3W
Rechargeable batte	ry:	>150 hours
Front protection:		IP55
Panel cut-out:		71x29 mm



APPLICATIONS

Plug-in cabinets, supermarket display cases, cold stores, control panels, upright fridges and freezers, refrigerated tables and all those plants where real time defrost starts are needed.



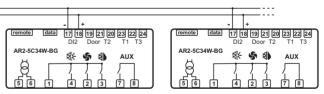
	CTIONS FOR USE	CON	FIGURAT	ION PARAMETERS	ADO	0 30min	Delay before door of
	re installing the instrument, please read this instruction booklet	To de	t access to the	parameter configuration menu, press button () + (i) for 5 seconds.	AHM	NON;	Operation in case of
carefully in order to ensure safe installation and optimum perform		 With I 	button 💌 or 🔺	select the parameter to be modified.		ALR; STP:	NON : high conden ALR : in case of ala
DESCRIPTION	INDICATIONS			isplay the value.] pressed, use button ♥ or ▲ to set the desired value.		SIF,	STP : in addition to t
	* Thermostat output			leased, the newly programmed value is stored and the following parameter is displayed. p, press button 🕅 or wait for 30 seconds.	AHT	-50120°	Condensation temp
	Fan output				ACC	052	Condenser periodic
	Defrost output	PAR	RANGE	DESCRIPTION		weeks	ACC value program disabled and CND
	Activation of 2nd parameter set	SCL	1°C; 2°C;	Readout scale. 1°C (with INP =SN4 only): measuring range -50/-9.9 19.9/80°C	IISM	NON;	Switchover mode to
i ■ 			°F	2°C : measuring range -50 120°C		MAN; HDD;	NON : inhibition to MAN : button (M) sw
Fig.1 - Front panel	Manual activation / Increase button.			°F: measuring range -55 240°F		DI2	HDD : automatic swi
 (i ◆) Info / Setpoint button. (i) ◆ Manual defrost / Decrease button. 	Exit / Stand-by button.			Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to re-configure the parameters relevant to the absolute and relative temperatures (SPL, SPH, SP, ALA, AHA, etc).	IISL	-50 IISH	DI2 : switchover to
	Exit / Stand-by button.	SPL	-50SPH	Minimum limit for SP setting.		-50 113H	Minimum limit for II
INSTALLATION		SPH	SPL.120°	Maximum limit for SP setting.	IISH	IISL IISH	Maximum limit for I Setpoint in mode 2
 Insert the controller through a hole measuring 71x29 mm. Make sure that electrical connections comply with the paragr 	aph "wiring diagrams". To reduce the effects of electromagnetic	SP	SPL SPH	Setpoint (value to be maintained in the room).	IISP IIHY	1 10°	OFF/ON differentia
disturbance, keep the sensor and signal cables well separate fro	m the power wires. y pressingly gently; if fitted, check that the rubber gasket adheres	C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode.	IIFC	NON;TMP;	
to the panel perfectly, in order to prevent debris and moisture infi	Itration to the back of the instrument.	HYS	110°	OFF/ON thermostat differential.		TIM	Fan control in mode
 Place the probe T1 inside the room in a point that truly represe Place the probe T2 on the evaporator where there is the maximum 					HDS	15	Controller sensitivity f
The function of probe T3 is determined by the parameter T3. W	ith T3= DSP the probe measures the temperature to be displayed. it must therefore be placed between the fins of the condensing				IIDF	099 hours	Time interval among
unit. With T3=2EU the probe measures the temperature of the s	econd evaporator and it must therefore be placed where there is			SP SP+HYS T[°]	SB	NO/YES	Stand-by button 🕑
the maximum formation of frost. With T3=NON , the third probe is	s disabled.			Refrigerating control (C-H=REF) Heating control (C-H=HEA)	DS	NO/YES	Door switch input e
OPERATION		CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the previous switchover. We recommend to set CRT=03 with HYS<2.0°.	DI2	NON;	DI2 digital input ope
DISPLAY During normal operation, the display shows either the temperatu	re measured or one of the following indications:	CT1	030min	Thermostat output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.		HPS; IISM;	NON : digital input : HPS : when contact
dEF Defrost in progress	hP Condenser high pressure alarm	CT2	030min	Thermostat output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON.		RDS; DSY	IISM : when contact RDS : when contact
oFF Controller in stand-by	h, Room high temperature alarm	012		Example: CT1=4, CT2=6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.		DOT	DSY : defrost synch
Condenser clean warning Door open alarm	<i>L</i> Room low temperature alarm <i>E I</i> Probe T1 failure	CSD	030min	Compressor stop delay after the door has been opened (active only if DS=YES).			The first controller in get defrost of all the
h_ Condenser high temperature alarm	E2 Probe T2 failure	DFM		Defrost start mode	LSM	NON;	Light control mode
	E3 Probe T3 failure		TIM; RTC	NON : defrost function is disabled (the following parameter will be FID). TIM : regular time defrost.		MAN;	NON : light output r
INFO MENU The information available in this menu is:				RTC : the defrost time is scheduled by parameters DH1, DH2DH6.		DOR	MAN : light ouput c DOR : light ouput s
<i>L</i> Instant probe 1 temperature	Lh, Maximum probe 1 temperature recorded	DFT	099 hours	Time interval among defrosts. When this time has elapsed since the last defrost, a new defrost cycle is started.	OA1	NON;	AUX output operati
<i>E 2</i> ★ Instant probe 2 temperature <i>E 3</i> ★ Instant probe 3 temperature	ELo Minimum probe 1 temperature recorded	DH1	HH.M	Scheduled time for defrost 1 to 6. HH hours from midnight, M tens of minutes. Accepted values go from 00.0 to 23.5. After "23.5" the value is "" that means "skipped defrost". <i>Example</i> : DH1=8.3 means 8.30		0-1; LGT;	NON : output disab 0-1 : the relay conta
י Minutes of the Real Time Clock	Loc Keypad state lock	 DH6		AM.		2CU;	LGT : output enable
hr''_{J} Hours of the Real Time Clock	disclosed and MADD = 0	DLI	-50120°	Defrost end temperature.		2EU; AL0;	2CU : output progra 2EU : output enable
*: displayed only if enabled (see §Configuration Parameters) **:		DTO	1120min	Maximum defrost duration.		AL1	AL0 : contacts oper AL1 : contacts make
Access to menu and information displayed. ■ Press and immediately release button (i).	 SETPOINT : display and modification Press button (i) for at least half second, to display the 	DTY	OFF;	Defrost type	2CD	0120 sec	Auxiliary compress
With button T or Select the data to be displayed.	setpoint value.		ELE; GAS	OFF: off cycle defrost (Compressor and Heater OFF). ELE: electric defrost (Compressor OFF and Heater ON).			seconds after the n
 Press button i to display value. To exit from the menu, press button X or wait for 10 seconds. 	■ By keeping button (i) pressed, use button (v) or (▲) to set the desired value (adjustment is within the minimum SPL and			GAS: hot gas defrost (Compressor and Heater ON).	INP	SN4; ST1	Temperature sense ST1, the probes mu
Reset of THI, TLO, CND recordings ■ With button (♥) or (▲) select the data to be reset.	the maximum SPH limit). ■ When button i is released, the new value is stored.	DPD	0240sec	Evaporator pump down. At the beginning of defrost, defrost outputs (determined by DTY) are OFF for DPD seconds.	OS1	-12.512.5°C	Probe T1 offset.
Display the value with button i.		DRN	030min	Pause after defrost (evaporator drain down time).	T2	NO/YES	Probe T2 enabling
While keeping button (i) pressed, use button (i).		DDM	RT;	Defrost display mode. During defrost the display will show:	OS2	-12.512.5°C	Probe T2 offset.
STAND-BY Button (), when pressed for 3 seconds, allows the controller to be pu	t = 0 a standby or output control to be required (with CD =VEC only)		LT; SP;	RT: the real temperature; LT : the last temperature before defrost;	T3	NON;	Auxiliary probe T3
	it on a standby or output control to be resumed (with SB=YES only).		DEF	SP : the current setpoint value;		DSP; CND;	NON : probe T3 no DSP : temperature
KEYPAD LOCK The keypad lock avoids undesired, potentially dangerous operati	ons, which might be attempted when the controller is operating in	DDY	060min	DEF : "dEF". Display delay. The display shows the information selected with parameter DDM during defrost and for		2EU	CND : condenser to 2EU : second evap
a public place. In the INFO menu, set parameter LOC=YES to in	nhibit all functions of the buttons. To resume normal operation of	DDT		DDY minutes after defrost termination.	OS3	-12.512.5°C	
keypad, adjust setting so that LOC=NO.		FID	NO/YES	Fans active during defrost.	TLD	130 min	Delay for minimum
SELECTION OF SECOND PARAMETER GROUP	t pre-programmed groups, in order for the fundamental control	FDD		Evaporator fan re-start temperature after defrost.	SIM	0100	Display slowdown.
parameters to be adapted quickly to changing needs. Change	over from Group I to Group II (and vice versa) may take place	FTO		Maximum evaporator fan stop after defrost.	ADR	1255	AR2-5 address for
	I), or AUTOMATICALLY when heavy duty conditions are detected UT DI2 is activated (the activation of DI2 selects Group II). If	FCM	NON; TMP;	Fan mode during thermostatic control. NON : The fans remain ON all the time;			
	Group II is signalled by the lighting up of the relevant LED on the		TIM	TMP : Temperature-based control. The fans are ON when the compressor is ON. When the compressor is turned OFF, the fans remain ON as long as the temperature difference Te-Ta is greater than FDT. The	WIRIN	IG DIAG	RAMS
				fans are turned ON again with FDH differential. (Te = Evaporator temperature, Ta = Air temperature);			
REAL TIME CLOCK SETTING The Real Time Clock (RTC) can be adjusted directly from the Ir	fo Menu (see Setpoint modification procedure). Tens of minutes			TIM : Timed-based control. The fans are ON when the compressor is ON. When the COMPR. COMPR.			
MIN range from 0 to 59 and Hours HRS range from 0 to 23. If RT	TC is adjusted just before an upcoming change of hour, verify the			Compressor is OFF, the fans switch ON and OFF according to parameteres FT1, FT2,	remote		19 21 20 23 22 24 Door T2 T1 T3
correctness of the setting again. The RTC does not automatically	y change upon Daylight Saving Time.			FT3 (See Fig.2).	AR2-50	:34W-BG	XUA (S
DEFROST Automatic defrost. Defrost starts automatically at fixed time-inter-	ervals or at programmed scheduled (up to six per 24 hours)			Fig 2 Time entimized for central (ECM=TIM)	ĝ		
<u>Timed defrost</u> . With DFM =TIM defrosts take place at regular in	ntervals when the timer reaches the value of DFT. For example,		100		L E E) 1 4 2	2 3 7 8
	ne specified by DH1DH6. The format of time is "HH.M", where	FDT	-1200° 1120°	Evaporator-Air temperature difference for the fans to turn OFF after the compressor has stopped. Temperature differential for fan re-start.			Fig.3 Connec
HH are hours and M are tens of minutes. To disable one or more	of the 6 scheduled defrosts, assign the value "" (it is the value setup (see §Configuration Parameters) and by keeping button (FDH	1120	Example: FDT = -1, FDH=3. In this case, after the compressor has stopped, the fans are OFF when Te			
pressed for 4 seconds during normal operation.			0.400	> Ta - 1 (FDT), whereas the fans are ON when Te < Ta - 4 (FDT-FDH).			
	(models AR2-5x3xxx only) are linked to each other as per Fig. The first controller which will start defrost, will also get all other	FT1		Fan stop delay after compressor stop. See Fig. 2			- RS4
controllers synchronised.	manually start a defrost, by pressing button (4) for 4 seconds. If	FT2	030min	Timed fan stop. With FT2=0 the fans remain on all the time.			
DFM=RTC hold button (1) down for 4 seconds to display DH1, the	en press button () again for 4 seconds to manually start a defrost.	FT3	030min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.			data
Defrost may be also started remotely, if DI2= RDS, through the m Defrost type . Once defrost has started. Compressor and Defrost	haking of the auxiliary contact DI2. t outputs are controlled according to parameter DTY. If FID=YES,	ATM	NON; ABS;	Alarm threshold management. NON : all temperature alarms are inhibited (<i>the following parameter will be</i> ADO).			
the evaporator fans are active during defrost.			REL	ABS : the values programmed in ALA and AHA represent the real alarm thresholds.			
Defrost termination. The actual defrost duration is influenced b <u>Time termination</u> : T2=NO and T3 different from 2EU: the evap	y a series of parameters. porator temperature is not monitored and defrost will last as long			REL : the values programmed in ALR and AHR are alarm differentials referred to SP and SP+HYS.			- S
as time DTO .	different from 2EU. In this case, if the sensor T2 measures the						
temperature DLI before the time DTO elapses, defrost will be ter	minated in advance.						
	U, OAU =2EU. This function is for the control of two independent orator which gets to temperature DLI first, waiting for the second			SP-ALR SP SP+HYS+AHR SP-HYS-ALR SP SP+AHR Temperature alarm with relative thresholds, Temperature alarm with relative thresholds,			
evaporator to get to that temperature before the time DTO elaps	es.			refrigerating control (ATM=REL, C-H=REF). heating control (ATM=REL, C-H=HEA).			<
order for the ice to melt completely and the resulting water to dra	s greater than 0, all outputs will remain off for DRN minutes, in in. Moreover, if probe T2 is active (T2 =YES), the fans will re-start	ALA	-50 120°	Low temperature alarm threshold.			
	ce versa, if probe T2 is not active (T2=NO) or after defrost has e FTO, after FTO minutes have elapsed the fans will be switched	AHA	-50 120°	High temperature alarm threshold.			
on anyway.	•	ALR	-12 0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.			
Caution: if DFM= NON or C-H= HEA all defrost functions are inhi a high pressure alarm, defrost is suspended. During defrost, higl	bited; if DFT =0, automatic defrost functions are excluded. During h temperature alarm is bypassed.	AHR	0 12°	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.			
,		ATI	T1; T2; T3	Probe used for temperature alarm detection.			
		ATD	0 120min				
		AID	0 12011111	Delay before alarm temperature warning.			

open alarm warning.	TECHNICAL L	DATA
of high condenser alarm nser alarm inhibited. arm, "HC" flashes in the display and the buzzer is switched on. the alarm symbols displayed, the compressor is stopped and defrosts are suspended.	Power supply AR2-5D AR2-5W	12Vac/dc ±10%, 3W 110 - 230Vac±10%, 50/60Hz, 3W
perature alarm (referred to T3 probe).	Relay output Compressor	12(5)A 240Vac
c cleaning. When the compressor operation time, expressed in weeks, matches the mmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is disappears from Info Menu.	Defrost Evap. Fan Auxiliary loads	7(2)A 240Vac 8(3)A 240Vac 7(2)A 240Vac 7(2)A 240Vac
to second parameter set use the second parameter group (<i>the following parameter will be</i> SB). witches the two parameter groups over. <i>i</i> tchover to the second parameter group, when heavy duty conditions are detected. the second parameter group when the auxiliary DI2 input makes.	Input NTC 10KΩ@25°C PTC 1000Ω@25°C	LAE Part No. SN4 LAE Part No. ST1
ISP setting.	-50120°C, -55240	0
IISP setting.	-50 / -9.9 19.9 / 80°(
2	Management	
al in mode 2.	Measurement acc <0.5°C within the measurement	
le 2. See FCM.	Real Time Clock	
for the automatic switchover from Group I to Group II (1=minimum, 5=maximum).	>150 hours; self-recha	rgeable
g defrosts in mode 2.	Operating condit	
enabling.	-10 130 0, 137000	5701.11.
enabling (closed when door is closed).	CE (Reference no EN60730-1; EN60730-	
eration 2 not active. ct opens a condensing unit high pressure alarm occurs. ct makes the controller will use group 2 parameters. ct makes a defrost is started (remote control). hronisation. The controllers, linked as per Fig. 3, will all start and end defrost together. in defrost will get defrost of all the others started. The last controller ending defrost will e others stopped.	EN55022 (Class B); EN50082-1	
not controlled. controlled through button M (if OA1=LGT). switched on when door is opened (if OA1=LGT).		
ion bled (always off). tacts follow the on/standby state of controller. led for light control. rammed for the control of an auxiliary compressor. led for the control of the electrical defrost of a second evaporator. en when an alarm condition occurs. ke when an alarm condition occurs.		
sor start delay. If OA1=2CU the auxiliary output is switched on with a delay of 2CD main compressor has cut-in. Both compressors are turned off at the same time.		
or selection. With INP=SN4, the probes must be the LAE models SN4; with INP = ust be the LAE models ST1		
(evaporator).		
operation ot fitted. T3 to be displayed. temperature measurement.		

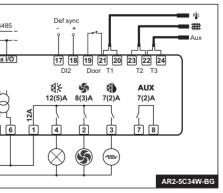
temperature measurement. porator temperature measurement.

temperature (TLO) and maximum temperature (THI) logging.

PC communication.



ction for synchronising defrost start and termination





UNIVERSAL DEFROST CONTROLLER WITH RTC

Selectable Refrigerating or Heating control • Selectable NTC10K or PTC input • FLEXICOLD function for energy saving or alternative setpoint • Cyclic defrosts or scheduled real time starts • Synchronized defrost start and termination with master-slave connection • Optional control of a second compressor or evaporator • Excellent evaporator fan control • Absolute or relative temperature alarms and door open alarm • Temperature and pressure monitoring and condensing unit maintenance • Light and standby control (On/Off) • Quick programming through ZOT-AR2 • Connection to LAE supervisory systems

APPLICATIONS:

On control panels for cold stores, plug-in and supermarket display cases.

	Functions	B13E-AG	C24E-AG	C35E-BG
Temperature	Thermostat	\checkmark	\checkmark	\checkmark
Inputs	Evaporator	\checkmark	\checkmark	\checkmark
	Auxiliary		\checkmark	\checkmark
Door switch input	Voltage free contact	\checkmark	\checkmark	\checkmark
Digital inputs	Voltage free contact	\checkmark		
	12÷24Vac voltage		\checkmark	
	Defrost synchronisation			\checkmark
Outputs	Thermostat	\checkmark	\checkmark	\checkmark
	Evaporator fans	\checkmark	\checkmark	\checkmark
	Defrost	\checkmark	\checkmark	\checkmark
	Auxiliary 1		\checkmark	\checkmark
	Auxiliary 2			\checkmark
Power supply	230Vac	\checkmark	\checkmark	\checkmark
Serial port	Serial port TTL	\checkmark	\checkmark	
	Serial port RS485			\checkmark
Keypad	Generic	\checkmark	\checkmark	\checkmark

AR2-27 Series

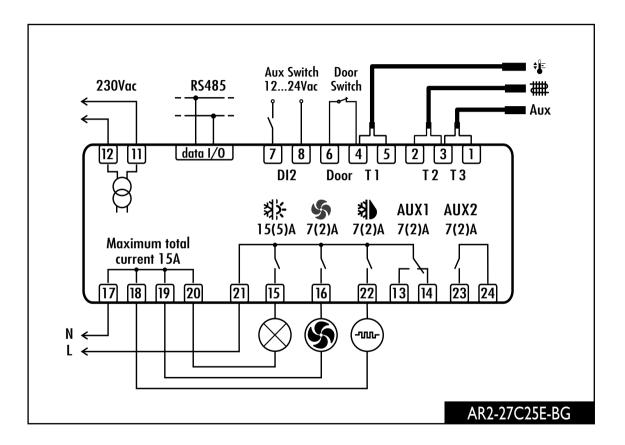


TECHNICAL DATA

Control Range:		-50÷120℃, -55…240°F
Resolution:		0.1 / 1 °C; °F
Accuracy:	NTC10K:	<±0.3°C (-40.0÷70.0°C)
	PTC1000:	<±0.5°C (-50÷120°C)
Sensor type:		selectable NTC10K or PTC1000
Power supply:		230Vac ±10% 50÷60Hz 3W
Rechargeable battery:		>150 hours
Front protection:		IP55

All models come with an alarm buzzer.

Versions with power supply 12Vac/dc and 115Vac are also available.



AR2-27 INSTRUCTION Thank you for having chosen an LAE electronic product. Before installing the in carefully in order to ensure safe installation and optimum performance.		inhibited, During a	if DFM= NON ; if DFT= 0, aut a high pressure	l or C-H =HEA all defrost functions are comatic defrost functions are excluded. e alarm, defrost is suspended. During ire alarm is bypassed.		AHR ATI ATD	0 12° T1; T2; T3 0 120min	High temperature al Probe used for temp
DESCRIPTION INDI	CATIONS		•	ION PARAMETERS	EVP1	ADO	0 30min	Delay before alarm
* TI	hermostat output					AHM	NON;	Delay before door o Operation in case of
	an output		t access to the) + (info) for 5 se	parameter configuration menu, press econds.	DEF1 OFF		ALR;	NON: high condens
	efrost output			select the parameter to be modified. display the value.			STP;	ALR: in case of alar STP: in addition to the
	ctivation of 2nd parameter set	 By kee 	eping button 🗊	$\overline{100}$ pressed, use button \bigtriangledown or \blacktriangle to set		AHT	-50120°	Condensation temp
	larm		red value. button [info] is i	released, the newly programmed	DEF2 OFF	ACC	052	Condenser periodic
		value is a	stored and the	following parameter is displayed. p, press button () or wait for 30			weeks	ACC value program disabled and CND d
		seconds		p, press button (b) or wait for 50		HDS	15	Controller sensitivity for
Fig.1 - Front panel (1/2 Info / Setpoint button.	lanual activation / Increase button.	PAR	RANGE	DESCRIPTION		IISM	NON;	Switchover mode to
	tand-by button.	SCL	1°C;	Readout scale.			MAN; HDD;	NON: inhibition to us MAN: button (M) swit
INSTALLATION		JOL	2°C;	1°C (with INP=SN4 only): measuring ra	ange -50/-9.9 19.9/80°C		DI2	HDD: automatic swite
 The AR2-27 controller, size 71x97x61 mm (WxHxD), is to be secured to a DIN r 	rail in such a position as to ensure that no liquid		°F	2°C : measuring range -50 120°C °F : measuring range -55 240°F			50 11011	DI2: switchover to the
infiltrates causing serious damage and compromising safety.					value, it is then <u>absolutely</u> necessary to re-configure the	IISL	-50 IISH	Minimum limit for IIS
 Make sure that electrical connections comply with the paragraph "wiring diagr- disturbance, keep the sensor and signal cables well separate from the power wire 				parameters relevant to the absolute a	and relative temperatures (SPL, SPH, SP, ALA, AHA, etc).	IISH	IISL 120°	Maximum limit for II
 Place the probe T1 inside the room in a point that truly represents the temperate Place the probe T2 on the evaporator where there is the maximum formation of 		SPL	-50SPH	Minimum limit for SP setting.		IISP	IISL IISH	Setpoint in mode 2.
The function of probe T3 is determined by the parameter T3. With T3=DSP the parameter T3.	robe measures the temperature to be displayed.	SPH	SPL.120°	Maximum limit for SP setting.		IIHY	1 10°	OFF/ON differential
With T3=CND the probe measures the condenser temperature, it must therefore unit. With T3=2EU the probe measures the temperature of the second evaporator		SP	SPL SPH	Setpoint (value to be maintained in the	room).	IIFT	NO/YES	Optimised fan contro
the maximum formation of frost. With T3= NON, the third probe is disabled.		C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) c	control mode.	IIDF	099hours	Defrost timer set to
OPERATION		HYS	110°	OFF/ON thermostat differential.		SB	NO/YES	Stand-by button 🕲
DISPLAY				₩ ••		DS	NO/YES	Door switch input er
During normal operation, the display shows either the temperature measured or or dEF Defrost in progress hP Condens	ne of the following indications: ser high pressure alarm					DI2	NON; HPS;	DI2 digital input ope NON : digital input 2
rE_c Recovery after defrost h_i Room high	gh temperature alarm			SP SP+HYS			IISM;	HPS: when contact
DFF Controller in stand-by L D Room low CL Condenser clean warning E I Probe T1	w temperature alarm			Refrigerating control (C-H=REF)	Heating control (C-H=HEA)		RDS; DSY	IISM : when contact RDS : when contact
EndEndEndEndEndDoor open alarmEndEndEndEndEndEnd		CRT	030min	Compressor rest time. The output is sw	vitched on again after CRT minutes have elapsed since the			DSY: defrost synchr
h_{c} Condenser high temperature alarm E_{a} Probe T3	3 failure			previous switchover. We recommend to				The first controller i defrost will get defro
INFO MENU		CT1	030min		is faulty. With CT1=0 the output will always remain OFF.	LSM	NON;	Light control mode
The information available in this menu is: <i>L</i> I Instant probe 1 temperature <i>L h</i> , Maximur	m probe 1 temperature recorded	CT2	030min		aulty. With CT2=0 and CT1>0 the output will always be ON. robe T1 failure, the compressor will cycle 4 minutes ON and 6		MAN; DOR	NON : light output n MAN : light ouput co
ELa Minimum	n probe 1 temperature recorded			minutes OFF.			DOK	DOR : light ouput sv
L^3 * Instant probe 3 temperature L_{DC} Minutes of the Real Time Clock L_{DC} Keypad	ssor working weeks	CSD	030min	Compressor stop delay after the door h	as been opened (active only if DS =YES).	OA1	NON;	AUX 1 output opera
$h_r f_j$ Hours of the Real Time Clock	State lock	2CD	0120sec		U =2CU the auxiliary output is switched on with a delay of 2CD s cut-in. Both compressors are turned off at the same time.		0-1; LGT;	NON : output disable 0-1 : the relay conta
*: displayed only if enabled (see §Configuration Parameters) **: displayed only if ${\it I}$	ACC > 0	DFM	NON;	Defrost start mode	s cut-in. Bour compressors are turned on at the same time.		2CU; 2EU;	LGT : output enable 2CU : output progra
Access to menu and information displayed.			TIM;	NON : defrost function is disabled (the	following parameter will be FID).		AL0;	2EU : output enable
 Press and immediately release button info. With button () or (A) select the data to be displayed. 			RTC	TIM : regular time defrost. RTC : the defrost time is scheduled by	parameters DH1, DH2DH6.		AL1	AL0 : contacts open AL1 : contacts make
 Press button [inf] to display value. To exit from the menu, press button () or wait for 10 seconds. 		DFT	099 ore		is time has elapsed since the last defrost, a new defrost cycle is	OA2	See OA1	AUX2 output operat
Reset of THI, TLO, CND recordings		DUI		started.			SN4; ST1	
 With button (v) or (A) select the data to be reset. Display the value with button (arro). 		DH1	HH.M		from midnight, M tens of minutes. Accepted values go from 00.0 t means "skipped defrost". <i>Example</i> : DH1 =8.3 means 8.30 AM	INP	5114; 511	Temperature sensor ST1, the probes mu
While keeping button info pressed, use button (1).		DH2	HH.M	Scheduled time for defrost 2		OS1	-12.512.5°C	Probe T1 probe.
 SETPOINT (display and modification of desired temperature value) Press button ^[1] for at least half second, to display the setpoint value. 		DH3	HH.M	Scheduled time for defrost 3		T2	NO/YES	Probe T2 enabling (
By keeping button 🕃 pressed, use button 🕑 or 🛦 to set the desired value (adju	ustment is within the minimum SPL and the	DH4	HH.M	Scheduled time for defrost 4		OS2	-12.512.5°C	Probe T2 offset.
 maximum SPH limit). When button (i) is released, the new value is stored. 		DH5	HH.M	Scheduled time for defrost 5		T3	NON; DSP;	Auxiliary probe T3 o NON: probe T3 not
STAND-BY		DH6	HH.M	Scheduled time for defrost 6			CND;	DSP: temperature T
Button (10), when pressed for 3 seconds, allows the controller to be put on a standby or c	output control to be resumed (with SB =YES only).	DLI	-50120°	Defrost end temperature.			2EU	CND: condenser ter 2EU: second evapo
KEYPAD LOCK		DTO	1120min	Maximum defrost duration.		OS3	-12.512.5°C	Probe 3 offset.
The keypad lock avoids undesired, potentially dangerous operations, which might		DTY	OFF;	Defrost type		TLD	130 min	Delay for minimum t
a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions keypad, adjust setting so that LOC=NO.	s of the buttons. To resume normal operation of		ELE; GAS	OFF: off cycle defrost (Compressor and ELE: electric defrost (Compressor OFF		SIM	0100	Display slowdown.
SELECTION OF SECOND PARAMETER GROUP				GAS: hot gas defrost (Compressor and	,	ADR	1255	AR2-27 address for
It's possible to select control parameters between two different pre-programmer		DRN	030min	Pause after defrost (evaporator drain de	,	WIRI	NG DIAG	RAMS
parameters to be adapted quickly to changing needs. Changeover from Group MANUALLY by pressing button (M) for 2 seconds (with IISM= MAN), or AUTOMATIC		DDY	060min		defrost the temperature continues to be displayed. If DDY >0, when defrost is over REC is displayed during DDY minutes.			
(with IISM=HDD), or when IISM=DI2 and the AUXILIARY INPUT DI2 is actival IISM=NON, switchover to Group II is inhibited. The activation of Group II is signal	ted (the activation of DI2 selects Group II). If	FID	NO/YES	Fans active during defrost.				Aux Switch Door
controller display.	led by the lighting up of the relevant LLD of the	FDD	-50120°	Evaporator fan re-start temperature afte	er defrost.	2	230Vac RS485	1224Vac Switch
REAL TIME CLOCK SETTING		FTO	0120min	Maximum evaporator fan stop after defi	rost.			786452
The Real Time Clock (RTC) can be adjusted directly from the Info Menu (see Set		FTC	NO/YES	· · · · · ·	TC = NO the fans remain on all the time.			DI2 Door T1
MIN range from 0 to 59 and Hours HRS range from 0 to 23. If RTC is adjusted just correctness of the setting again. The RTC does not automatically change upon Date the RTC does not automatically change upon Date and the setting again.								\$\$. \$ \$ AUX 15(5)A 7(2)A 7(2)A 7(2)A
DEFROST				S			Maximum total current 15A	
Automatic defrost. Defrost starts automatically at fixed time-intervals or at progra						(17 18 19 20	21 15 16 22 13 1
<u>Timed defrost</u> . With DFM=TIM defrosts take place at regular intervals when the with DFM=TIM and DFT=06, a defrost will take place every 6 hours.	timer reaches the value of DFI . For example,				FT2 FT3 FT2 FT3	N e] 🛇 🔇 💬
 <u>Scheduled defrost</u>. With DFM=RTC defrost takes place at time specified by DI HH are hours and M are tens of minutes. To disable one or more of the 6 schedule 				- · ·	ed fan control (FTC=YES)		·	
after "23.5"). Parameters DH1DH6 are accessible both in the setup (see §Config		FT1	0180sec	Fan stop delay after compressor stop. S	•			
pressed for 4 seconds during normal operation. <u>Synchronised defrost</u> . With DI2= DSY and when more units AR2-27 are linked to	each other as per Fig. 3 (see parameter table).	FT2	030min	Timed fan stop. With FT2=0 the fans re	emain on all the time.			
synchronised defrosts of all linked controllers will take place. The first controller		FT3	030min	Timed fan run. With FT3=0, and FT2 >	0, the fans remain off all the time.		Γ	
 manual or remote defrost start. If DFM=TIM it's possible to manually start a 	defrost, by pressing button 🚯 for 4 seconds. If	ATM	NON;	Alarm threshold management.		1	- 12 11 data 7	+ 8645231
DFM=RTC hold button (1) down for 4 seconds to display DH1, then press button (1)			ABS; REL	ABS: the values programmed in ALA a	ted (the following parameter will be ADO). nd AHA represent the real alarm thresholds.			12 Door T1 T2 T3
Defrost may be also started remotely, if DI2 =RDS, through the making of the auxiliary contact DI2. Defrost type . Once defrost has started, Compressor and Defrost outputs are controlled according to parameter DTY . If FID =YES,					nd AHR are alarm differentials referred to SP and SP+HYS.		AR2-27C35E-AG	
the evaporator fans are active during defrost. Defrost termination . The actual defrost duration is influenced by a series of para	meters.						17 18 19 20 21	
<u>Time termination</u> : T2 =NO and T3 different from 2EU: the evaporator temperature is not monitored and defrost will last as long as time DTO .				OFF				Fig 2 Comment
■ Temperature monitoring of one evaporator: T2=YES and T3 different from 2E				SP-ALR SP SP+HYS	+AHR SP-HYS-ALR SP SP+AHR			Fig.3 Connection
temperature DLI before the time DTO elapses, defrost will be terminated in advan Temperature monitoring of two evaporators: T2 =YES, T3 =2EU, OAU =2EU. This				Temperature alarm with relative thre	,			
evaporators and it switches off the individual heating of the evaporator which gets				refrigerating control (ATM=REL, C-H	H=REF). heating control (ATM=REL, C-H=HEA).			
evaporator to get to that temperature before the time DTO elapses (see figure). Resuming thermostatic cycle. When defrost is over, if DRN is greater than 0,	all outputs will remain off for DRN minutes, in	ALA	-50 120°	Low temperature alarm threshold.				
order for the ice to melt completely and the resulting water to drain. Moreover, if pr	robe T2 is active (T2=YES), the fans will re-start	AHA	-50 120°	High temperature alarm threshold.				
when the evaporator gets to a temperature lower than FDD; Vice versa, if probe come to an end, such condition does not occur by end of the time FTO, after FTO		ALR	-12 0°	Low temperature alarm differential. With	h ALR=0 the low temperature alarm is excluded.			
				1				

AHR 0... 12° High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.

temperature alarm detection

arm temperature warning.

or open alarm warning.

se of high condenser alarm

lenser alarm inhibited.

alarm, "HC" flashes in the display and the buzzer is switched on.

to the alarm symbols displayed, the compressor is stopped and defrosts are suspended. emperature alarm (referred to T3 probe).

odic cleaning. When the compressor operation time, expressed in weeks, matches the grammed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is D disappears from Info Menu.

vity for the automatic switchover from Group I to Group II (1=minimum, 5=maximum).

le to second parameter set

to use the second parameter group (the following parameter will be SB).

) switches the two parameter groups over. switchover to the second parameter group, when heavy duty conditions are detected. r to the second parameter group when the auxiliary DI2 input makes.

r IISP setting.

or IISP setting.

ntial in mode 2

ontrol enabling in mode 2.

t to start a defrost in mode 2.

🕑 enabling.

ut enabling (closed when door is closed).

operation

out 2 not active act opens a condensing unit high pressure alarm occurs.

ntact makes the controller will use group 2 parameters. ntact makes a defrost is started (remote control). /nchronisation. The controllers, linked as per Fig. 3, will all start and end defrost together. ler in defrost mode will get defrost of all the others started. The last controller ending lefrost of all the others stopped.

ut not controlled.

but not controlled. Sut controlled through button \mathbb{M} (if **OAU=**LGT). Sut switched on when door is opened (if **OAU=**LGT).

peration

isabled (always off). contacts follow the on/standby state of controller.

habled for light control. rogrammed for the control of an auxiliary compressor.

abled for the control of the electrical defrost of a second evaporator

pen when an alarm condition occurs.

. nake when an alarm condition occurs.

eration. See OA1.

ensor selection. With INP = SN4, the probes must be the LAE models SN4..; with INP s must be the LAE models ST1...

ing (evaporator).

T3 operation not fitted.

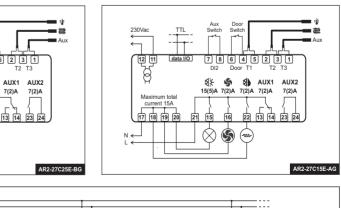
re T3 to be displayed.

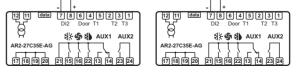
temperature measurement.

aporator temperature measurement

um temperature (TLO) and maximum temperature (THI) logging.

for PC communication





ection for synchronising defrost start and termination

TECHNICAL DATA

12Vac/dc ±10%, 3W 230Vac+10% 50/60Hz 3W

15(5)A 240Vac

7(2)Á 240Vac

7(2)A 240Vac 7(2)A 240Vac 7(2)A 240Vac

7(2)A 240Vac

LAE Part No. SN4.

LAE Part No. ST1..

115Vac±10%, 50/60Hz, 3W

Power supply AR2-27...D AR2-27 F AR2-27...U

Relay output

Compressor Evap. Fan Defrost Auxiliary loads 1 Auxiliary loads 2

Input

NTC 10KΩ@25°C PTC 1000Ω@25°C

Measurement Range -50...120°C, -55...240°F -50 / -9.9 ... 19.9 / 80°C (NTC10K only)

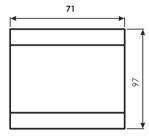
Measurement accuracy <0.5°C within the measurement range

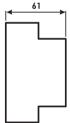
Real Time Clock battery >150 hours; self-rechargeable

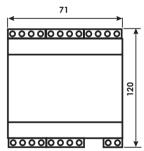
Operating conditions -10 ... +50°C; 15%...80% r.H.

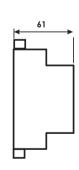
CE (Reference norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front protection IP55











AD-32 169×38×78 MM

UNIVERSAL POWERFUL DEFROST CONTROLLER

Selectable Refrigerating or Heating control • Selectable NTCIOK or PTC input • FLEXICOLD function for energy saving or alternative setpoint • Timed or optimised defrost control • Synchronized defrost start and termination with master-slave connection • Optional control of a second compressor or evaporator • Excellent evaporator fan control • Absolute or relative temperature alarms and door open alarm • Temperature and pressure monitoring and condensing unit maintenance • Light and standby control (On/Off) • Quick programming through ZOT-AD key • Connection to LAE supervisory systems

APPLICATIONS:

Plug-in cabinets, supermarket display cases, cold stores, upright fridges and freezers, refrigerated tables.

	Functions	Q13W-AG	S24W-AG	S35W-BG
Temperature	Thermostat	\checkmark	\checkmark	\checkmark
Inputs	Evaporator	\checkmark	\checkmark	\checkmark
	Auxiliary		\checkmark	\checkmark
Digital inputs	Voltage free contact	\checkmark	\checkmark	\checkmark
Digital inputs	Voltage free contact	\checkmark		
	12÷24Vac voltage		\checkmark	
	Defrost synchronisation			\checkmark
	Thermostat 15(5)A	\checkmark	\checkmark	\checkmark
Outputs	Evaporator fans	\checkmark	\checkmark	\checkmark
	Defrost	\checkmark	\checkmark	\checkmark
	Auxiliary 1		\checkmark	\checkmark
	Auxiliary 2			\checkmark
Connections	Screw terminals		\checkmark	\checkmark
	M/F terminals + fastons	\checkmark		
Power supply	115÷230Vac	\checkmark	\checkmark	\checkmark
Serial port	Serial port TTL	\checkmark	\checkmark	
	Serial port RS485			\checkmark

AD-32 Series

TECHNICAL DATA

Control Range:		-50÷120°C,-55÷240°F
Resolution:		0.1 / 1 °C; °F
Accuracy:	NTC10K:	<±0.3°C (-40.0÷70.0°C)
-	PTC1000:	<±0.5°C (-50÷120°C)
Sensor type:		selectable NTC10K or PTC1000
Power supply:		115÷230V~ ±10% 50÷60Hz 3W
Front protection:		IP55
Panel cut-out:		163x31.5 mm

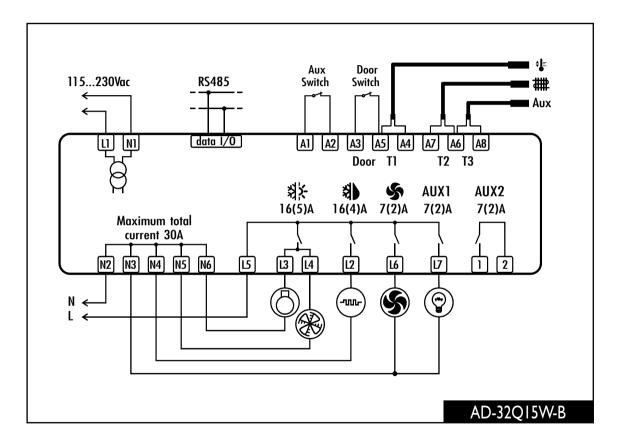
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110

All models come with an alarm buzzer

On request, the AD-32 is also available with 7...30Vdc power supply.

On request, the AD2-32 is also available with gasket for a better protection between bezel and metal panel.



AD-32 INSTRU	CTIONS FOR USE	Caution: if DFM =NON or C-H =HEA all defrost functions are inhibited; if DFT =0, automatic defrost functions are excluded. During a high pressure alarm, defrost is suspended. During defrost, high temperature alarm is bypassed.				NON; ALR;	Operation in case of high condenser alarn NON : high condenser alarm inhibited.
Thank you for having chosen an LAE electronic product. Before carefully in order to ensure safe installation and optimum perform		CON	FIGURAT	TION PARAMETERS		STP;	ALR : in case of alarm, "HC" flashes in the STP : in addition to the alarm symbols displa
DESCRIPTION	ance.				AHT	-50120°	Condensation temperature alarm (referred
		With t	outton 文 or 🖊	parameter configuration menu, press button ⓓ + 🐏 for 5 seconds. Ŋ select the parameter to be modified.	ACC	052	Condenser periodic cleaning. When the c
	• • × · i ×			display the value. IF pressed, use button I♥ or I▲ to set the desired value.		weeks	ACC value programmed, "CL" flashes in disabled and CND disappears from Info M
		 When 	button 💷 is	released, the newly programmed value is stored and the following parameter is displayed. p, press button \mathbf{x} or wait for 30 seconds.	HDS	15	Controller sensitivity for the automatic switchow
	Ο				IISM	NON;	Switchover mode to second parameter set
<i>@</i> lae		PAR	RANGE	DESCRIPTION		MAN; HDD;	NON : inhibition to use the second parame MAN : button (II°) switches the two parame
Fig.1 - Front panel		SCL	1°C; 2°C;	Readout scale. 1°C (with INP =SN4 only): measuring range -50/-9.9 19.9/80°C		DI2	HDD : automatic switchover to the second parameter of
❀r_ Setpoint / Edit button. ▲ Manual defrost / Increase b	utton. 🛛 Mute alarm / Decrease button.		°F	2°C : measuring range -50 120°C °F : measuring range -55 240°F	IISL	-50IISH	Minimum limit for IISP setting.
i x Info / exit button. II [•] 2nd parameter set button.	ই Light button. ৩ Stand-by button.			Caution: upon changing the SCL value, it is then <u>absolutely</u> necessary to re-configure the	IISH	IISL120°	Maximum limit for IISP setting.
INDICATIONS			50. ODU	parameters relevant to the absolute and relative temperatures (SPL, SPH, SP, ALA, AHA, etc). Minimum limit for SP setting.	IISP	IISLIISH	Setpoint in mode 2.
		SPL SPH	-50SPH SPL.120°	Maximum limit for SP setting.	IIHY	110°	OFF/ON differential in mode 2.
 Thermostat output Defrost output Fan output Activation of 2nd parameter set 	Alarm	SP	SPL SPH	Setpoint (value to be maintained in the room).	IIFT	NO/YES	Fan control in mode 2. See FTC.
	Light output activated	C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode.	IIDF	099 hours	Time interval among defrosts in mode 2.
INSTALLATION		HYS	110°	OFF/ON thermostat differential.	SB	NO/YES	Stand-by button 🕑 enabling.
The AD-32 controller, size 169x38x78mm (WxHxD), is inserted fixed by means of the screws on the rear flange. If fitted, check the screws on the rear flange.					DS	NO/YES	Door switch input enabling (closed when c
prevent infiltration to the back of the instrument. Make sure that electrical connections comply with the paragra	nh "wiring diagrams". To reduce the effects of electromagnetic				DI2	NON; HPS;	DI2 digital input operation NON : digital input 2 not active.
disturbance, keep the sensor and signal cables well separate from	n the power wires.			SP SP+HYS T[°] SP-HYS SP T[°]		IISM;	HPS : when contact opens a condensing u
 Place the probe T1 inside the room in a point that truly represent Place the probe T2 on the evaporator where there is the maxim 	um formation of frost.			Refrigerating control (C-H=REF) Heating control (C-H=HEA)		RDS; DSY	IISM : when contact makes the controller w RDS : when contact makes a defrost is sta
The function of probe T3 is determined by the parameter T3. Wit With T3=CND the probe measures the condenser temperature, i		CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the previous switchover. We recommend to set CRT=03 with HYS<2.0°.			DSY : defrost synchronisation. The control The first controller in defrost will get defros
unit. With T3 =2EU the probe measures the temperature of the se the maximum formation of frost. With T3 =NON, the third probe is	cond evaporator and it must therefore be placed where there is	CT1	030min	Thermostat output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.			get defrost of all the others stopped.
OPERATION	disabled.	CT2	030min	Thermostat output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON.	LSM	NON; MAN;	Light control mode NON : light output not controlled.
DISPLAY				Example: CT1=4, CT2= 6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.		DOR	MAN : light ouput controlled through butto
During normal operation, the display shows either the temperature	e measured or one of the following indications:	CSD	030min	Compressor stop delay after the door has been opened (active only if DS=YES).	OA1	NON;	DOR : light ouput switched on when door in AUX 1 output operation
dEF Defrost in progress gFF Controller in stand-by	hP Condenser high pressure alarm h_I Room high temperature alarm	2CD	0120sec	Auxiliary compressor start delay. If OAx=2CU the auxiliary output is switched on with a delay of 2CD seconds after the main compressor has cut-in. Both compressors are turned off at the same time.		0-1;	NON : output disabled (always off).
Condenser clean warning	Lo Room low temperature alarm	DFM	NON;	Defrost start mode		LGT; 2CU;	0-1 : the relay contacts follow the on/stand LGT : output enabled for light control.
ם Door open alarm הר Condenser high temperature alarm	E Image: Probe T1 failure E Probe T2 failure		TIM; FRO	NON : defrost function is disabled (the following parameter will be FID). TIM : regular time defrost.		2EU; AL0;	2CU : output programmed for the control of 2EU : output enabled for the control of the
	E Probe T3 failure			FRO : the defrost time count is only increased when the conditions occur for frost to form on the evaporator (optimised time increase).		AL1	AL0 : contacts open when an alarm condit AL1 : contacts make when an alarm condition
INFO MENU The information available in this menu is:		DFT	099 hours	Time interval among defrosts. When this time has elapsed since the last defrost, a new defrost cycle is started.	OA2	See OA1	AUX2 output operation. See OA1.
F I Instant probe 1 temperature	Lh, Maximum probe 1 temperature recorded	DFB	NO/YES	Defrost timer backup. With DFB=YES, after a power interruption, the timer resumes the count from where	INP	SN4; ST1	Temperature sensor selection. With INP=
<i>E 2</i> ★ Instant probe 2 temperature <i>E 3</i> ★ Instant probe 3 temperature	Lo Minimum probe 1 temperature recorded			it was left off with ±30 min. approximation. With DFB=NO, after a power interruption, the defrost timer will re-start to count from zero.			ST1, the probes must be the LAE models
E 3 * Instant probe 3 temperature	Loc Keypad state lock	DLI	-50120°	Defrost end temperature.	OS1		Probe T1 offset.
*: displayed only if enabled (see §Configuration Parameters) **: d	isplayed only if ACC > 0	DTO	1120min	Maximum defrost duration.	T2 OS2	NO/YES	Probe T2 enabling (evaporator). Probe T2 offset.
Access to menu and information displayed. ■ Press and immediately release button [j].	SETPOINT : display and modification	DTY	OFF; ELE;	Defrost type OFF: off cycle defrost (Compressor and Heater OFF).	T3	NON;	Auxiliary probe T3 operation
With button v or select the data to be displayed.	Press button (*) for at least half second, to display the setpoint value.		GAS	ELE: electric defrost (Compressor OFF and Heater ON). GAS: hot gas defrost (Compressor and Heater ON).		DSP; CND;	NON : probe T3 not fitted. DSP : temperature T3 to be displayed.
To exit from the menu, press button x or wait for 10 seconds.	■ By keeping button () pressed, use button () or (▲) to set the desired value (adjustment is within the minimum SPL and	DRN	030min	Pause after defrost (evaporator drain down time).		2EU	CND : condenser temperature measureme
 Reset of THI, TLO, CND recordings ■ With button ♥ or ▲ select the data to be reset. 	the maximum SPH limit). ■ When button (] is released, the new value is stored.	DDY	060min	Display during defrost. If DDY=0 during defrost the temperature continues to be displayed. If DDY>0,	OS3	-12.512.5°C	2EU : second evaporator temperature mea Probe 3 offset.
 Display the value with button (). While keeping button (). 	,	FID	NO/YES	during defrost the display shows DEF, when defrost is over REC is displayed during DDY minutes. Fans active during defrost.	TLD	130 min	Delay for minimum temperature (TLO) and
		FDD	-50120°	Evaporator fan re-start temperature after defrost.	SIM	0100	Display slowdown.
STAND-BY Button (1), when pressed for 3 seconds, allows the controller to be put	on a standby or output control to be resumed (with SB =YES only).	FTO	0120min	Maximum evaporator fan stop after defrost.	ADR	1255	AD-32 address for PC communication.
KEYPAD LOCK		FTC	NO/YES	Optimised fan control enabling. With FTC = NO the fans remain on all the time.			
The keypad lock avoids undesired, potentially dangerous operatio a public place. In the INFO menu, set parameter LOC=YES to inl				COMPR. COMPR. OFF COMPR.			
keypad, adjust setting so that LOC=NO.					WIRI	NG DIAG	RAMS
SELECTION OF SECOND PARAMETER GROUP							
It's possible to select control parameters between two different parameters to be adapted quickly to changing needs. Changeo				FT1 FT2 FT3 FT2 FT3			+ - A & A & A & A & A & A & A & A & A & A &
MANUALLY by pressing button [II°] for 2 seconds (with IISM= detected (with IISM=HDD), or when IISM=DI2 and the AUXILIAR	MAN), or AUTOMATICALLY when heavy duty conditions are			Fig.2 Optimised fan control (FTC= YES)	6		344476488 Door T1 T2 T3 왕 \$ AUX1 AUX2
If IISM=NON, switchover to Group II is inhibited. The activation o		FT1	0180sec	Fan stop delay after compressor stop. See Fig. 2	AD-3	2Q35W-В	AD-32Q35W-B
the controller display.		FT2	030min	Timed fan stop. With FT2=0 the fans remain on all the time.			
DEFROST Automatic defrost. Defrost starts automatically as soon as the time set with parameter DFT has elapsed.		FT3	030min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.			Fig.3 Connection for synchronising a
 <u>Timed defrost</u>. With DFM=TIM defrosts take place at regular int with DFM=TIM and DFT=06, a defrost will take place every 6 hou 		ATM	NON;	Alarm threshold management.			
 Optimized defrost. With DFM=FRO the timer is only increased w 	when the conditions occur for frost to form on the evaporator, until		ABS; REL	NON : all temperature alarms are inhibited (<i>the following parameter will be</i> ADO). ABS : the values programmed in ALA and AHA represent the real alarm thresholds.	115	230Vac	Aux Door RS485 Switch Switch
the time set with parameter DFT is matched. If the evaporator we climatic conditions. With setpoints much lower than 0°C, defrost fr	equency mainly depends on the refrigerator operating time.		REL	REL : the values programmed in ALR and AHR represent the real alarm thresholds.	→ →		
 <u>Synchronised defrost</u>. With DI2=DSY and when more units (n 3, synchronised defrosts of all linked controllers will take place. 							data I/O A1 A2 A3 A5 A4 A7 A6 A
controllers synchronised. <u>Defrost time count backup</u> . At the power-up, if DFB =YES, the defrost timer resumes the time count from where it was left off before							Door T1 T2 T3
the power interruption. Vice versa, with DFB=NO, the time count re	-starts from 0. In stand-by, the accumulated time count is frozen.			SP-ALR SP SP+HYS+AHR SP-HYS-ALR SP SP+AHR		Ч	翁⊱ 翁) ≶ AUX1 A 16(5)A 16(4)A 7(2)A 7(2)A 7
Manual or remote defrost start. It's possible to manually start a defrost, by pressing button () for 2 seconds, or defrost may be started remotely, if DI2=RDS, through the making of the auxiliary contact DI2.				Temperature alarm with relative thresholds, refrigerating control (ATM=REL, C-H=REF). Temperature alarm with relative thresholds, heating control (ATM=REL, C-H=REF).		Maximum total current 30A	
Defrost type . Once defrost has started, Compressor and Defrost the evaporator fans are active during defrost.		ALA	-50 120°	Low temperature alarm threshold.		N2 N3 N4 N5	
Defrost termination. The actual defrost duration is influenced by ■ Time termination: T2=NO and T3 different from 2EU: the evapore		AHA	-50 120°	High temperature alarm threshold.	N ←		
as time DTO . • <u>Temperature monitoring of one evaporator</u> ; T2 =YES and T3 d		ALR	-12 0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.	L ←		
temperature DLI before the time DTO elapses, defrost will be tern	ninated in advance.	AHR	0 12°	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.			
Temperature monitoring of two evaporators: T2=YES, T3=2EU	. OAU=2EU. This function is for the control of two independent						

ATI

T1; T2; T3 Probe used for temperature alarm detection.

ATD 0... 120min Delay before alarm temperature warning.

ADO 0... 30min Delay before door open alarm warning.

<u>Temperature monitoring of two evaporators</u>: T2=YES, T3=2EU, Tota EU. This function is for the control of two independent evaporators and it switches off the individual heating of the evaporator which gets to temperature DLI first, waiting for the second evaporator to get to that temperature before the time DTO elapses. Resuming thermostatic cycle. When defrost is over, if DRN is greater than 0, all outputs will remain off for DRN minutes, in

order for the ice to melt completely and the resulting water to drain. Moreover, if probe T2 is active (T2=YES), the fans will re-start when the evaporator gets to a temperature lower than FDD; Vice versa, if probe T2 is not active (T2=NO) or after defrost has come to an end, such condition does not occur by end of the time FTO, after FTO minutes have elapsed the fans will be switched on anyway.

"HC" flashes in the display and the buzzer is switched on.

alarm symbols displayed, the compressor is stopped and defrosts are suspended ture alarm (referred to T3 probe).

leaning. When the compressor operation time, expressed in weeks, matches the ned, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is appears from Info Menu.

he automatic switchover from Group I to Group II (1=minimum, 5=maximum).

cond parameter set

e the second parameter group (the following parameter will be SB). hes the two parameter groups over.

hover to the second parameter group, when heavy duty conditions are detected. a second parameter group when the auxiliary DI2 input makes.

bling (closed when door is closed).

pens a condensing unit high pressure alarm occurs.

hakes the controller will use group 2 parameters. hakes a defrost is started (remote control).

insation. The controllers, linked as per Fig. 3, will all start and end defrost together. lefrost will get defrost of all the others started. The last controller ending defrost will thers stopped.

controlled.

trolled through button () (if OAx=LGT). ched on when door is opened (if OAx=LGT).

follow the on/standby state of controller.

for light control. ned for the control of an auxiliary compressor.

for the control of the electrical defrost of a second evaporator.

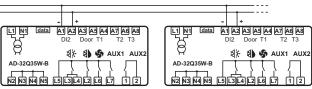
hen an alarm condition occurs. when an alarm condition occurs.

selection. With INP=SN4, the probes must be the LAE models SN4..; with INP = be the LAE models ST1...

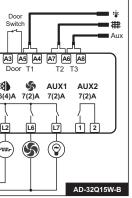
3 to be displayed. aperature measurement.

tor temperature measurement.

nperature (TLO) and maximum temperature (THI) logging.



n for synchronising defrost start and termination



TECHNICAL DATA

Power supply AD-32....L AD-32....W

Relay output

Compressor Defrost Evap, Fan Auxiliary loads 1 Auxiliary loads 2

Input NTC 10KΩ@25°C PTC 1000Ω@25°C

LAE Part No. SN4.. LAE Part No. ST1..

Measurement Range

-50...120°C, -55...240°F -50 / -9.9 ... 19.9 / 80°C (NTC10K only)

Measurement accuracy <0.5°C within the measurement range

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Reference norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1



7...30Vdc ±10%, 5W 115...230Vac±10%, 50/60Hz, 5W

16(5)A 240Vac 16(4)A 240Vac 7(2)A 240Vac 7(2)A 240Vac 7(2)A 240Vac



DEFROST CONTROLLER FOR REFRIGERATED TRANSPORTS

Selectable Heating/Refrigerating control with Neutral Band • Selectable NTCIOK or PTC input • FLEXICOLD function for energy saving or alternative setpoint • Timed or optimised defrost start, or remote start option • Defrost timer backup in case of power failure • Direct compressor control through high power relay • Optional control of a second compressor or evaporator • Excellent evaporator fan control • Absolute or relative temperature alarms and door open alarm • Temperature and pressure monitoring and condensing unit maintenance • Light and standby control (On/Off) • Quick programming through ZOT-AH1 key • Connection to LAE supervisory systems

APPLICATIONS:

refrigerated transports, HT and LT cold storage rooms, plug-in cabinets, display cases, open counters.

	Functions	B14L-AG	B13W-AG	C24W-BL
Temperature inputs	Thermostat	\checkmark	\checkmark	\checkmark
	Evaporator	\checkmark	\checkmark	\checkmark
	Auxiliary			\checkmark
Door switch input	Voltage free contact	\checkmark	\checkmark	\checkmark
Digital input DI2	Voltage free contact	\checkmark	\checkmark	
	Voltage 12÷24Vac			\checkmark
Outputs	Thermostat	\checkmark	\checkmark	\checkmark
	Evaporator fans	\checkmark	\checkmark	\checkmark
	Defrost	\checkmark	\checkmark	\checkmark
	Auxiliary	\checkmark		\checkmark
Power supply	115-230Vac		\checkmark	\checkmark
	7-30Vdc	\checkmark		
Serial port	TTL	\checkmark	\checkmark	
	RS485			\checkmark
Keypad	Generic	\checkmark	\checkmark	
	With light button			\checkmark

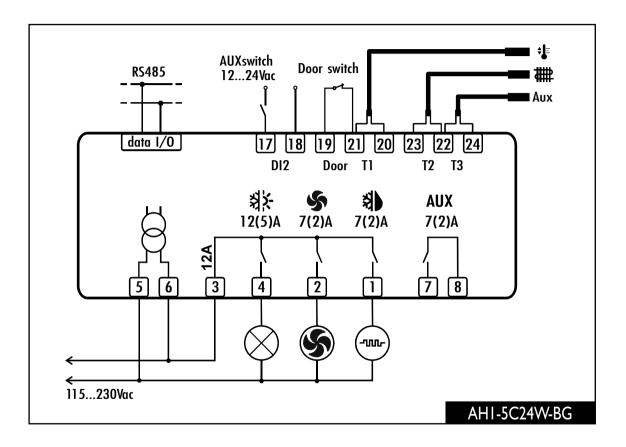
AH1-5 series

All models come with an alarm buzzer. All models are fitted with detachable screw terminals. On request, the AHI-5 is also available with gasket for a better protection between bezel and metal panel.

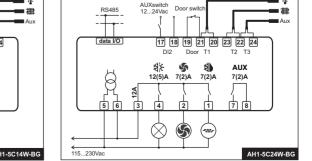


TECHNICAL DATA

Control Range:		-50÷120°C, -55÷240°F
Resolution:		0.1 / 1 °C; °F
Accuracy:	NTC10K:	<±0.3°C (-40.0÷70.0°C)
	PTC1000:	<±0.5°C (-50÷120°C)
Sensor type:		selectable NTC10K or PTC1000
Power supply:		115-230V~ ±10% 50÷60Hz 3W
Front protection:		IP55
Panel cut-out:		71x29 mm



AH1-5 INSTRUCTIONS FOR USE			I or C-H=HEA all defrost functions are	ATM	NON;	Alarm threshold management.
			tomatic defrost functions are excluded.		ABS;	NON: all temperature alarms are inhibited (the following parameter will be ADO).
Thank you for having chosen an LAE electronic product. Before installing the instrument, please read this instruction booklet carefully in order to ensure safe installation and optimum performance.	defrost,	high temperati	ire alarm is bypassed.		REL	ABS: the values programmed in ALA and AHA represent the real alarm thresholds. REL: the values programmed in ALR and AHR are alarm differentials referred to SP and SP+HYS.
			ter control. The defrost output can be			ON ON
DESCRIPTION INDICATIONS	used to HED an					
🕸 Thermostat output						
Fan output	CON	FIGURAT				SP-ALR SP SP+HYS+AHR SP-HYS-ALR SP SP+AHR
		access to the	parameter configuration menu, press			
Defrost output		(i) + (i) for 5 se				Temperature alarm with relative thresholds, refrigerating control (ATM =REL, C-H =REF). Temperature alarm with relative thresholds, heating control (ATM =REL, C-H =HEA).
Cite II of Activation of 2nd parameter set			select the parameter to be modified.			
i I I I ◆ I ◆ I I I • I I I ◆ I I I ◆ I I ◆ I I ◆ I I ◆			splay the value. Dressed, use button ♥ or ▲ to set	ALA	-50 120°	Low temperature alarm threshold.
Fig.1 - Front panel		red value.		AHA	-50 120°	High temperature alarm threshold.
i € Info / Setpoint button.			leased, the newly programmed value	ALR	-12 0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.
 Interference of the sector in the sector in			ring parameter is displayed. p, press button iജ) or wait for 30 seconds.			
		t itoitt the setu	p, press button of wait for 50 seconds.	AHR	0 12°	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.
INSTALLATION	PAR	RANGE	DESCRIPTION	ATI	T1; T2; T3	Probe used for temperature alarm detection.
Insert the controller through a hole measuring 71x29 mm.	SCL	1°C;	Readout scale.			
Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic distributions and aligned below the sure state for the survival s	JOL	2°C;	1°C (with INP=SN4 only): measuring range -50/-9.9 19.9/80°C	ATD	0 120min	Delay before alarm temperature warning.
 disturbance, keep the sensor and signal cables well separate from the power wires. Fix the controller to the panel by means of the suitable clips, by pressingly gently; if fitted, check that the rubber gasket adheres 		°F	2°C : measuring range -50 120°C	ADO	0 30min	Delay before door open alarm warning.
to the panel perfectly, in order to prevent debris and moisture infiltration to the back of the instrument.			°F : measuring range -55 240°F Caution: upon changing the SCL value, it is then absolutely necessary to re-configure the	AHM	NON;	Operation in case of high condenser alarm
Place the probe T1 inside the room in a point that truly represents the temperature of the stored product.			parameters relevant to the absolute and relative temperatures (SPL, SPH, SP, ALA, AHA, etc.).		ALR;	NON: high condenser alarm inhibited.
 Place the probe T2 on the evaporator where there is the maximum formation of frost. The function of probe T3 is determined by the parameter T3. With T3=DSP the probe measures the temperature to be displayed. 	SPL	-50SPH	Minimum limit for SP setting.		STP;	ALR: in case of alarm, "HC" flashes in the display and the buzzer is switched on.
With T3=CND the probe neasures the condenser temperature, it must therefore be placed between the fins of the condensing	SPH		Maximum limit for SP setting.			STP: in addition to the alarm symbols displayed, the compressor is stopped and defrosts are suspended.
unit. With T3=2EU the probe measures the temperature of the second evaporator and it must therefore be placed where there is	-			AHT	-50120°	Condensation temperature alarm (referred to T3 probe).
the maximum formation of frost. With T3=NON, the third probe is disabled.	SP	SPL SPH	Setpoint (value to be maintained in the room).	ACC	052	Condenser periodic cleaning. When the compressor operation time, expressed in weeks, matches the
OPERATION	C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode.		weeks	ACC value programmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is
	HYS	110°	OFF/ON thermostat differential.			disabled and CND disappears from Info Menu.
DISPLAY	113	110		HDS	15	Controller sensitivity for the automatic switchover from Group 1 to Group 2 (1=minimum, 5=maximum).
During normal operation, the display shows either the temperature measured or one of the following indications:				IISM	NON;	Switchover mode to second parameter set
dEF Defrost in progress hP Condenser high pressure alarm					MAN;	NON: inhibition to use the second parameter group (the following parameter will be SB).
$r \in \mathcal{E}$ Recovery after defrost h_{II} Room high temperature alarm ρFF Controller in stand-by l_{III} Room low temperature alarm			OFF OFF		HDD;	MAN: button M switches the two parameter groups over.
E_{L} Condenser clean warning E_{L} Probe T1 failure			SP SP+HYS T[°] SP-HYS SP T[°]		DI2	HDD: automatic switchover to the second parameter group, when heavy duty conditions are detected. DI2: switchover to the second parameter group when the auxiliary DI2 input makes.
d Door open alarm E2 Probe T2 failure			Refrigerating control (C-H=REF) Heating control (C-H=HEA)	1101	50 IICH	Minimum limit for IISP setting.
hc Condenser high temperature alarm E3 Probe T3 failure	HED	010°	Heating neutral zone. HYS $ -$	IISL	-50 IISH	
INFO MENU			When T1 < SP-HED-HYS, the defrost output is	IISH	IISL 120°	Maximum limit for IISP setting.
The information available in this menu is:			turned on, when T1 > SP-HED the defrost output	IISP	IISL IISH	Setpoint in mode 2.
E/L Minimum probe 1 temperature recorded			is turned off. During this operation, the defrost timer is cleared.	IIHY	1 10°	OFF/ON differential in mode 2.
<i>E c n s c n c <i>n c n c <i>n c n c n c <i>n c n c n c n c <i>n c n c n c <i>n c n c n c <i>n c n c n c n c n c <i>n c n c n c n c <i>n c n c n c n c n c n c <i>n c n c n c n c <i>n c n c n c n c <i>n c n c n c <i>n c n c <i>n c n c n c n n c <i>n n c n n n n n n n n n n</i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i></i>			The fan output is switched according to the $HEH = $			
E3 Instant probe 3 temperature			defrost output (heater), regardless of the FID	IIFT	NO/YES	Optimised fan control enabling in mode 2.
2 h , Maximum probe 1 temperature recorded			parameter. ON	IIDF	099 hours	Defrost timer set to start a defrost in mode 2.
Access to menu and information displayed.			DEF OFF	SB	NO/YES	Stand-by button () enabling.
Press and immediately release button ① .						
■ With button 🛡 or 🔺 select the data to be displayed.	HEH	010°	Heating hysteresis.	DS	NO/YES	Door switch input enabling (closed when door is closed).
 Press button i to display value. To exit from the menu, press button of value of valu	1	0	If HEH= 0 the heater function associated to the defrost output is inhibited.	DI2	NON;	DI2 digital input operation
Reset of THI. TLO. CND recordings	CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the		HPS;	NON : digital input 2 not active.
■ With button ♥ or ▲ select the data to be reset.			previous switchover. We recommend to set CRT=03 with HYS<2.0°.		IISM; RDS	HPS: when contact opens a condensing unit high pressure alarm occurs. IISM : when contact makes the controller will use group 2 parameters.
■ Display the value with button i.	CT1	030min	Thermostat output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.		RD5	RDS : when contact makes a defrost is started (remote control).
■ While keeping button [] pressed, use button [¥].	CT2	030min	Thermostat output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON.	LSM	NON;	Light control mode
SETPOINT (display and modification of desired temperature value) ■ Press button (♣) for at least half second, to display the setpoint value.		03011111	Example: CT1=4, CT2= 6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6		MAN;	NON : light output not controlled.
By keeping button () presed, use button () of to set the desired value (adjustment is within the minimum SPL and the			minutes OFF.		DOR	MAN : light ouput controlled through button M (if OAU =LGT).
maximum SPH limit).	CSD	030min	Compressor stop delay after the door has been opened (active only if DS =YES).			DOR : light ouput switched on when door is opened (if OAU=LGT).
When button () is released, the new value is stored.	2CD	0120sec	Auxiliary compressor start delay. If OAU = 2CU the auxiliary output is switched on with a delay of 2CD	OAU	NON;	AUX output operation
STAND-BY	200	01205ec	seconds after the main compressor has cut-in. Both compressors are turned off at the same time.		0-1; LGT;	NON : output disabled (always off). 0-1 : the relay contacts follow the on/standby state of controller.
Button (), when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES	DFM	NON;	Defrost start mode		2CU;	LGT : output enabled for light control.
only).	DEN	TIM;	NON: defrost function is disabled (the following parameter will be FID).		2EU;	2CU : output programmed for the control of an auxiliary compressor.
KEYPAD LOCK		FRO	TIM: regular time defrost.		ALO;	2EU : output enabled for the control of the electrical defrost of a second evaporator.
The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controller is operating in			FRO: the defrost time count is only increased when the conditions occurs for frost to form on the		AL1	AL0 : contacts open when an alarm condition occurs. AL1 : contacts make when an alarm condition occurs.
a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of	DET	0.00	evaporator (optimised time increase)	INP	SN4; ST1	Temperature sensor selection. With INP = SN4, the probes must be the LAE models SN4; with INP =
keypad, adjust setting so that LOC=NO.	DFT	099 11001'S	Time interval among defrosts. When this time has elapsed since the last defrost, a new defrost cycle is started.		0.11, 011	ST1, the probes must be the LAE models ST1
SELECTION OF SECOND PARAMETER GROUP	DFB	NO/YES	Defrost timer count backup. With DFB= YES, after a power interruption, the timer resumes the count from	OS1	-12.512.5°C	Probe T1 offset.
It's possible to select control parameters between two different pre-programmed groups, in order for the fundamental control			where it was left off with ±30 min. approximation. With DFB= NO, after a power interruption, the defrost	T2		Probe T2 enabling (evaporator).
parameters to be adapted quickly to changing needs.			timer will re-start to count from zero.	OS2		Probe T2 offset.
Changeover from Group I to Group II (and vice versa) may take place manually by pressing button M for 2 seconds (with IISM=MAN), or automatically when heavy duty conditions are detected (with IISM=HDD), or when IISM=DI2 and the auxiliary input	DLI	-50120°	Defrost end temperature.			
DI2 is activated (the activation of DI2 selects Group II). If IISM= NON, switchover to Group II is inhibited. The activation of Group II	DTO	1120min	Maximum defrost duration.	T3	NON; DSP;	Auxiliary probe T3 operation NON: probe T3 not fitted.
is signalled by the lighting up of the relevant LED on the controller display.	DTY	OFF;	Defrost type		CND;	DSP: temperature T3 to be displayed.
DEFROST	2.1	ELE;	OFF: off cycle defrost (Compressor and Heater OFF).		2EU	CND: condenser temperature measurement.
Automatic defrost. A defrost is started automatically as soon as the time set with parameter DFT has elapsed.		GAS	ELE: electric defrost (Compressor OFF and Heater ON).			2EU: second evaporator temperature measurement.
■ <u>Timed defrost</u> . With DFM =TIM the timer increment is continuous and defrosts take place at regular intervals. For example, with			GAS: hot gas defrost (Compressor and Heater ON).	OS3	-12.512.5°C	Probe 3 offset.
DFM=TIM and DFT=06, a defrost will take place every 6 hours.	DRN	030min	Pause after defrost (evaporator drain down time).	TLD	130 min	Delay for minimum temperature (TLO) and maximum temperature (THI) logging.
Optimized defrost. With DFM=FRO the timer is only increased when the conditions occur for frost to form on the evaporator, until the time set with parameter DFT is matched. If the evaporator works at 0°C, defrost frequency depends on the thermal load and	DDY	060min	Display during defrost. If DDY =0 during defrost the temperature continues to be displayed. If DDY >0,	SIM	0100	Display slowdown.
climatic conditions. With setpoints much lower than 0°C, defrost frequency mainly depends on the refrigerator operating time.			during defrost the display shows DEF, when defrost is over REC is displayed during DDY minutes.	ADR	1255	AH1-5 address for PC communication.
Defrost time count backup. At the power-up, if DFB=YES, the defrost timer resumes the time count from where it was left off	FID	NO/YES	Fans active during defrost.		1200	
before the power interruption. Vice versa, with DFB=NO, the time count re-starts from 0. In stand-by, the accumulated time count is frame.	FDD	-50120°	Evaporator fan re-start temperature after defrost.	WIRI	NG DIAG	RAMS
is frozen. Manual or remote defrost start. It's possible to manually start a defrost, by pressing button () for 2 seconds, or defrost may be	FTO	0120min	Maximum evaporator fan stop after defrost.			
started remotely, if DI2 =RDS, through the making of the auxiliary contact DI2.	FTC	NO/YES	Optimised fan control enabling. With FTC = NO the fans remain on all the time.		_	AUXswitch
Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to parameter DTY. If FID=YES,			CMP ON CMP OFF CMP ON		- RS485 AU	JX switch Door switch
the evaporator fans are active during defrost.					-++-	
 Defrost termination. The actual defrost duration is influenced by a series of parameters. <u>Time termination</u>: T2=NO and T3 different from 2EU: the evaporator temperature is not monitored and defrost will last as long 					data I/O	
as time DTO.						DI2 Door T1 T2 T3 DI2 Door T1 T2 T3
<u>Temperature monitoring of one evaporator</u> : T2=YES and T3 different from 2EU. In this case, if the sensor T2 measures the			F1 FT2 FT3 FT2 FT3		L.J.	xua (\$ 🗞 🐇 🖕
temperature DLI before the time DTO elapses, defrost will be terminated in advance.			FT1 FT2 FT3 FT2 FT3 Fiq.2 Optimised fan control (FTC= YES)		ä –	12(5)A 7(2)A 7(2)A 7(2)A 7(2)A
<u>Temperature monitoring of two evaporators</u> : T2=YES, T3=2EU, OAU=2EU. This function is for the control of two independent evaporators and it switches off the individual heating of the evaporator which gets to temperature DLI first, waiting for the second					A ₹	\
evaporator to get to that temperature before the time DTO elapses (see figure).	FT1	0180sec	Fan stop delay after compressor stop. See Fig. 2.		563	
Resuming thermostatic cycle. When defrost is over, if DRN is greater than 0, all outputs will remain off for DRN minutes, in	FT2	030min	Timed fan stop. With FT2=0 the fans remain on all the time.			
order for the ice to melt completely and the resulting water to drain. Moreover, if probe T2 is active (T2=YES), the fans will re-start when the evaporator gets to a temperature lower than FDD; Vice versa, if probe T2 is not active (T2=NO) or after defrost has			Timed fan run With ET3=0 and ET2 > 0 the fore remain off all the time			
come to an end, such condition does not occur by end of the time FTO, after FTO minutes have elapsed the fans will be switched	FT3	030min	Timed fan run. With FT3= 0, and FT2 > 0, the fans remain off all the time.			
on anyway.				115230	Jvac	AH1-5C14W-BG 115230Vac AH1-5C24W-BG



TECHNICAL DATA

 Power supply

 AH1-5...D
 12Vdc ±10%, 3W

 AH1-5...W
 110 - 230Vac±10%, 50/60Hz, 3W

 AH1-5...L
 7-30Vdc, 3W

Relay outputs

12(5)A 240Vac 7(2)A 240Vac 7(2)A 240Vac 7(2)A 240Vac

Inputs NTC 10KΩ@25°C PTC 1000Ω@25°C

LAE part No. SN4... LAE part No. ST1...

Measurement Range -50...120°C, -55...240°F -50 / -9.9 ... 19.9 / 80°C (NTC10K only)

Measurement accuracy <0.5°C within the measurement range

Real Time Clock battery >150 hours; self-rechargeable

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front protection



BIT2.5 86x82x44 MM

SPLIT DEFROST CONTROLLER

• Three highly rated relay outputs • Alternate set of parameters for energy saving • Management of multiple alarms • Option of setpoint adjustment via a potentiometer • Standby button (On/Off) • Option of universal power supply FCO • Connection to LAE supervisory systems

APPLICATIONS:

Temper

Digital

Outputs

Power : Serial p

Upright refrigerators, bottle coolers, plug-in display cases for shops and supermarkets, cold stores, control panels.



TECHNICAL DATA: LCD-55 DISPLAY UNIT

Dimensions: 77x35x20 mm (WxHxD)	Panel cut-out:	71x29mm
Front protection:		IP55

TECHNICAL DATA

Range:	-50110°C, -58180°F
Resolution:	0.1 / 1 °C; °F
Precision:	<±0.5°C within the measurement range
Sensor type:	NTCIOK
Power supply:	115Vac, 230Vac or universal 115230Vac ±10% 50÷60Hz 3W

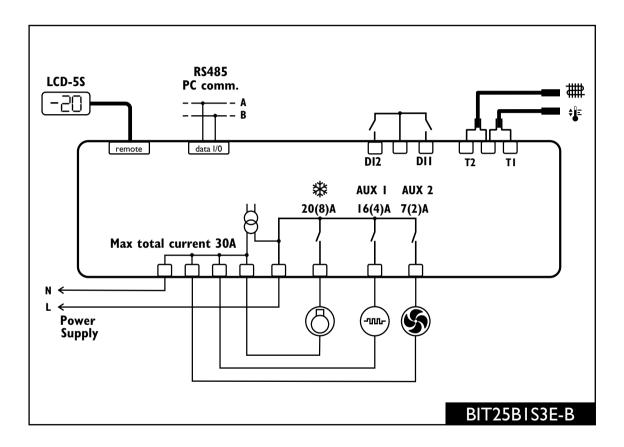
	Functions	AOS2E-A	B1S3E-B
rature inputs	Thermostat	\checkmark	\checkmark
	Evaporator		\checkmark
inputs	DI1 digital input	\checkmark	\checkmark
•	DI2 digital input		\checkmark
s	Thermostat	\checkmark	\checkmark
	Auxiliary 1		\checkmark
	Auxiliary 2		\checkmark
supply	230Vac	\checkmark	\checkmark
port	TTL	\checkmark	

BIT25 series

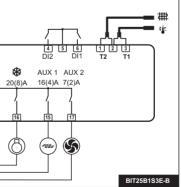
All models come with an alarm buzzer

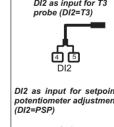
RS485

On request, the AR2-5 is also available with gasket for a better protection between bezel and metal panel.

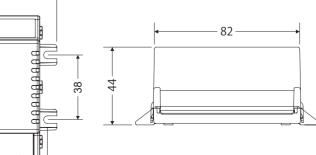


BIT25 INSTRUCTIONS FOR USE	CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the	IISL	-50 IISH	Minimum limit for IISP setting.
Thank you for having chosen an LAE electronic product. Before installing the instrument, please read this instruction booklet	CT1	030min	previous switchover. We recommend to set CRT=03 with HYS<2.0°. Thermostat output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.			Maximum limit for IISP setting.
carefully in order to ensure safe installation and optimum performance.	CT2	030min	Thermostat output for when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON.	IISP		Setpoint in mode 2.
			Example: CT1=4, CT2= 6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.			OFF/ON differential in mode 2.
Thermostat output	CSD	030min	Compressor stop delay after the door has been opened (active only if D1=DOR or DI2=DOR).		NON; TMP;	Fan control in mode 2. See FCM.
Defrost output	DFM	NON; TIM:	Defrost start mode NON : defrost function is disabled (the following parameter will be FCM).	=	TIM	
i → M × → ↓ Activation of 2nd parameter set		FRO	TIM : regular time defrost. FRO : the defrost time count is only increased when the conditions occur for frost to form on the		099 hours	Built-in timer value for an automatic defrost to take place, in mode 2.
Fig.1 - Front panel			evaporator (optimised time increase).	SB DI1	NO/YES NON;	Stand-by button () enabling.
Fig. 1 - Front panel I ◆ Info / Setpoint button. Increase button / Manual activation.	DFT		Built-in timer value for an automatic defrost to take place.		DOR; ALR;	NON : digital input 1 not active. DOR : door input.
Manual defrost / Decrease button. ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★	DFB	NO/YES	Defrost timer backup. With DFB=YES, after a power interruption, the timer resumes the count from where it was left off with ±30 min. approximation. With DFB=NO, after a power interruption, the		RDS.	ALR: when contact opens an alarm is generated (if AHM=STP, the compressor is stopped and defrosts are suspended).
INSTALLATION	DLI	-50110°C	defrost timer will re-start to count from zero. Defrost end temperature.			RDS : when contact makes a defrost is started (remote control).
 The BIT-25 controller has a size 86x82x44 mm (WxHxD). Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic 	DTO	1120min	Maximum defrost duration.	DI2	NON; DOR;	DI2 digital input operation NON : digital input 2 not active.
disturbance, keep the sensor and signal cables well separate from the power wires.	DTY	OFF; ELE;	Defrost type OFF: off cycle defrost (Compressor and Heater OFF).		ALR; RDS;	DOR : door input. ALR : when contact opens an alarm is generated (if AHM=STP, the compressor is stopped and
 Place the probe T1 inside the room in a point that truly represents the temperature of the stored product. If present, place the probe T2 on the evaporator where there is the maximum formation of frost. 	02 Q	GAS	ELE: electric defrost (Compressor OFF and Heater ON). GAS: hot gas defrost (Compressor and Heater ON).		IISM; T3;	defrosts are suspended). RDS : when contact makes a defrost is started (remote control).
If probe T3 is connected to DI2, its function is determined by the parameter T3M. With T3M=DSP the probe measures the temperature to be displayed. With T3M=CND the probe measures the condenser temperature, it must therefore be placed between	비 히 DPD	0240sec	Evaporator pump down. At the beginning of defrost, defrost outputs (determined by DTY) are OFF		PSP	IISM : when contact makes the second parameter group is active. T3 : probe T3 input.
the fins of the condensing unit.		030min	for DPD seconds. Pause after defrost (evaporator drain down time).			PSP : potentiometer setpoint input.
OPERATION DISPLAY		RT;	Defrost display mode. During defrost the display will show:	ଳୁ T3M	DSP; CND.	Auxiliary probe T3 operation DSP : temperature T3 to be displayed.
During normal operation, the display shows either the temperature measured or one of the following indications:		LT; SP;	RT: the real temperature; LT : the last temperature before defrost;	=	-12.5 12.5°C	CND : condenser temperature measurement. Probe 3 offset.
dEF Defrost in progress h, Room high temperature alarm oFF Controller in stand-by Loo Room low temperature alarm		DEF	SP : the current setpoint value; DEF : "dEF".	- 033 PSL		Minimum setpoint adjusted via potentiometer.
C Condenser clean warning	DDY	060min	Display delay. The display shows the information selected with parameter DDM during defrost and			Range of setpoint adjusted via potentioneter
\bar{h}_{C} Condenser high temperature alarm \bar{E} Probe T3 failure	FID	NO/YES	for DDY minutes after defrost termination. Fans active during defrost.	IS I I I	0.010.0 0	Example: with PSL=2.0 and PSR=8.0, the setpoint changes between 2.0°C and 10.0°C (PSL+PSR).
	FDD		Evaporator fan re-start temperature after defrost (referred to T2 probe).	POF	NO/YES	Potentiometer standby enabling.
INFO MENU The information available in this menu is:	FTO	0120min	Maximum evaporator fan stop after defrost.			With POF=YES, when the potentiometer is turned to the minimum, the controller will be put on standby.
E / Instant probe 1 temperature E / Minimum probe 1 temperature recorded E / Instant probe 2 temperature E / Minimum probe 1 temperature recorded C / D / ** Compressor working weeks	FCM	NON; TMP;	Fan mode during thermostatic control. NON : The fans remain ON all the time;	LSM	NON; MAN;	Light control mode NON : light output not controlled.
E3 * Instant probe 3 temperature		TIM	TMP : Temperature-based control. The fans are ON when the compressor is ON. When the compressor is turned OFF, the fans remain ON as long as the temperature difference T2-T1 is		D10;	MAN : light ouput controlled through button M
 <i>L h</i>, Maximum probe 1 temperature recorded *: displayed only if enabled (see §Configuration Parameters) ** : displayed only if ACC > 0 			greater than FDT. The fans are turned ON again with FDH differential. (T1 = Air temperature, T2 = Evaporator temperature):		D2O; D2C.	D10 : when DI1 is open, light output is on. D20 : when DI2 is open, light output is on.
Access to menu and information displayed.			TIM : Timed-based control. The fans	OA1	NON;	D2C : when DI2 is closed, light output is on. AUX 1 output operation
 Press and immediately release button (i). With button (v) or (▲) select the data to be displayed. SETPOINT : display and modification Press button (i) for at least half second, to display the 			When the compressor is OFF, the $ON \rightarrow 4$		FAN; DEF;	NON : output disabled (always off). FAN : output enabled for fan control.
 Press button 1 to display value. To exit from the menu, press button 1 or wait for 10 seconds. By keeping button 1 pressed, use button 1 or to set the 			parameteres FT1, FT2, FT3.		LGT; 0-1;	DEF : output enabled for defrost control. LGT : output enabled for light control.
Reset of THI, TLO, CND recordings desired value (adjustment is within the minimum SPL and the maximum SPH limit).			FT1 FT2 FT3 FT2 FT3		ALO; ALC	0-1 : the relay contacts follow the on/standby state of controller. ALO : contacts open when an alarm condition occurs.
 Display the value with button []. While keeping button [] pressed, use button [X]. 	FDT	-12.00.0°C	Evaporator-Air temperature difference for the fans to turn OFF after the compressor has stopped.		ALC	ALC : contacts open when an alarm condition occurs.
STAND-BY	FDH	1.012.0°C	Temperature differential for fan re-start. Example: FDT = -1.0, FDH=3.0. In this case, after the compressor has stopped, the fans are OFF	OA2	See OA1	AUX2 output operation. See OA1.
Button (1), when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB =YES only).			when T2 > T1 - 1.0 (FDT), whereas the fans are ON when T2 < T1 - 4.0 (FDT-FDH).	OS1 T2		Probe T1 offset. Probe T2 enabling (evaporator).
KEYPAD LOCK	FT1 FT2		Fan stop delay after compressor stop. Timed fan stop. With FT2=0 the fans remain on all the time.	OS2		Probe T2 offset.
The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controller is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of the provided adjust that LOC=YES to inhibit all functions of the buttons.	F12 FT3	0 30min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.	TLD	130 min	Delay for minimum temperature (TLO) and maximum temperature (THI) logging.
keypad, adjust setting so that LOC=NO. SELECTION OF SECOND PARAMETER GROUP	ATM	NON;	Alarm threshold management.	SCL	1°C; 2°C;	Readout scale. 1°C : measuring range -50110°C (0.1°C resolution within -9.9 ÷ 19.9°C interval, 1°C outside)
It's possible to select control parameters between two different pre-programmed groups, in order for the fundamental control		ABS; REL	NON : all temperature alarms are inhibited (<i>the following parameter will be</i> ADO). ABS : the values programmed in ALA and AHA represent the real alarm thresholds.		°F	2°C : measuring range -50110°C °F : measuring range -58180°F
parameters to be adapted quickly to changing needs. Changeover from Group I to Group II (and vice versa) may take place MANUALLY by pressing button M for 2 seconds (with IISM-MAN), or AUTOMATICALLY when IISM-DI2 and the AUXILIARY			REL : the values programmed in ALR and AHR are alarm differentials referred to SP and SP+HYS.	SIM	0100	Display slowdown.
INPUT DI2 is activated (the activation of DI2 selects Group II). If IISM=NON, switchover to Group II is inhibited. The activation of Group II is signalled by the lighting up of the relevant LED on the controller display.				ADR	1255	BIT25 address for PC communication.
SETPOINT ADJUSTMENT VIA POTENTIOMETER			OFF SP-ALR SP SP+HYS+AHR	WIRING	DIAGRA	MS
With DI2=PSP the setpoint is set via a 10KΩ linear potentiometer connected to DI2. The setpoint changes between PSL (10KΩ) and PSL+PSR (0Ω) proportionally. With POF=YES, if the potentiometer is turned to the minimum (0Ω), the controller will be put on			Temperature alarm with relative thresholds (ATM=REL).			
standby. If the second parameter group is active, the setpoint used will be IISP .	တ္တ ALA	-50 110°C	Low temperature alarm threshold.	LCD-5S	P	RS485 C comm. →→→ A ## DI2 as input for T3 probe (DI2=T3)
DEFROST Automatic defrost. Defrost starts automatically when the defrost timer matches the time value set with DFT.					-	
 <u>Timed defrost</u>. With DFM=TIM defrosts take place at regular intervals of DFT hours. For example, with DFM=TIM and DFT=06, a defrost will take place every 6 hours. 	AHA	-50 110°C	High temperature alarm threshold.		remote	
 <u>Optimized defrost</u>. With DFM=FRO the timer is increased only when the condition for frost to form in the evaporator occurs. Once the DFT value is reached, defrost takes place. If the evaporator works at 0°C, defrost frequency depends on the thermal load and 		-12.00.0°C	Low temperature alarm differential.			ж аих 1 аих 2 DI2 Ц 20(8)A 16(4)A 7(2)A DI2
climatic conditions. With setpoints much lower than 0°C, defrost frequency mainly depends on the refrigerator operating time. ■ Defrost time count backup. At the power-up, if DFB =YES, the defrost firequency mainly depends on the refrigerator operating time.		0.0 10.000	With ALR=0 the low temperature alarm is excluded.		Max total cu	rrent 30A
the power interruption. Vice versa, with DFB =NO, the time count re-starts from 0. In stand-by, the accumulated time count is frozen. Manual or remote defrost start . It's possible to manually start a defrost, by pressing button () for 2 seconds, or defrost may be	AHR	0.0 12.0 °C	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.		[10] [1	1 12 13 14 16 15 17 (DI2=PSP)
	ITA B	T1; T2; T3	Probe used for temperature alarm detection.	N ← L ←		
started remotely, if DI1 =RDS (DI2 =RDS), through the making of the auxiliary contact DI1 (DI2).				Power		
started remotely, if DI1=RDS (DI2=RDS), through the making of the auxiliary contact DI1 (DI2). Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to parameter DTY. If FID=YES, the evaporator fans are active during defrost.	BS or R	0 120min	Delay before alarm temperature warning	Supply		
started remotely, if DI1=RDS (DI2=RDS), through the making of the auxiliary contact DI1 (DI2). Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to parameter DTY. If FID=YES, the evaporator fans are active during defrost. Defrost termination. The actual defrost duration is influenced by a series of parameters. <u>Time termination</u> : T2=NO. the evaporator temperature is not monitored and defrost will last as long as time DTO.	BS or R	0 120min	Delay before alarm temperature warning.	Supply		BIT25B1S3E-B DI2
 started remotely, if DI1=RDS (DI2=RDS), through the making of the auxiliary contact DI1 (DI2). Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to parameter DTY. If FID=YES, the evaporator fans are active during defrost. Defrost termination. The actual defrost duration is influenced by a series of parameters. <u>Time termination</u>: T2=NO. the evaporator temperature is not monitored and defrost will last as long as time DTO. <u>Temperature termination</u>: T2=YES. In this case, if the sensor T2 measures the temperature DLI before the time DTO elapses, defrost will be terminated in advance. 	BS or R		Delay before alarm temperature warning. Delay before door open alarm warning.	Supply		
 started remotely, if DI1=RDS (DI2=RDS), through the making of the auxiliary contact DI1 (DI2). Defrost type. Once defrost has started, Compressor and Defrost outputs are controlled according to parameter DTY. If FID=YES, the evaporator fans are active during defrost. Defrost termination. The actual defrost duration is influenced by a series of parameters. <u>Time termination</u>: T2=NO. the evaporator temperature is not monitored and defrost will last as long as time DTO. <u>Temperature termination</u>: T2=YES. In this case, if the sensor T2 measures the temperature DLI before the time DTO elapses, defrost will be terminated in advance. Resuming thermostatic cycle. When defrost is over, if DRN is greater than 0, all outputs will remain off for DRN minutes, in order for the ice to melt completely and the resulting water to drain. Moreover, the fans will re-start only when the evaporator temperature 	ATM = ABS or R	0 30min NON;	Delay before door open alarm warning. Operation in case of high condenser alarm	Supply		
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TECHNICAL DATA

Power supply BIT25...E BIT25...U BIT25...W

230Vac±10%, 50/60Hz, 3W 115Vac±10%, 50/60Hz, 3W 115...230Vac±10%, 50/60Hz, 3W

Relay output max loads Compressor Auxiliary loads 1 Auxiliary loads 2

20(8)A 240Vac 16(4)A 240Vac 7(2)A 240Vac

Input NTC 10KΩ@25°C LAE Part No. SN4...

Measurement Range -50 / -9.9 ... 19.9 / 110°C -50...110°C, -58...180°F

Measurement accuracy <0.5°C within the measurement range

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Approvals and Reference norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

CLEVER SPLIT DEFROST CONTROLLER

Refrigeration controller with cyclic defrosts • Enhanced ECO Energy Saving management • Synchronised defrosts among more controllers • Optional control of a second compressor or evaporator • Up to 2 auxiliary outputs (Light, switched loads etc.) • Excellent evaporator fan control • Universal mains power supply • Optional power supply for refrigerated transports • Several alarm sources: temperature, door, condenser high temperature etc. • Quick programming through ZOT-BDI • Connection to LAE supervisory systems, including wireless option • Many display options: coloured LED's with DU5S or new high contrast LCD, fully customised

APPLICATIONS:

Upright refrigerators, plug-in and supermarket display cases, cold stores, control panels.

	Functions	BOQ3W-A	C1S4L-C	C1S5W-B
Temperature inputs	Thermostat	~	\checkmark	\checkmark
	Evaporator	\checkmark	\checkmark	\checkmark
	Auxiliary		\checkmark	\checkmark
DI1, DI2 digital inputs	Voltage free contact	\checkmark		
DI3 aux. digital input	Voltage free contact/ defrost synchronization		\checkmark	\checkmark
Outputs	Thermostat	\checkmark	\checkmark	\checkmark
outputo	Evaporator fans	\checkmark	\checkmark	\checkmark
	Defrost	\checkmark	\checkmark	\checkmark
	Auxiliary 1		\checkmark	\checkmark
	Auxiliary 2			\checkmark
Connections	Quick with M/F connectors	\checkmark		
	Screw terminals		\checkmark	\checkmark
Power supply	100÷240Vac	\checkmark		\checkmark
	7÷30Vdc		\checkmark	
Aux functions	TTL serial port	~		
	RS485 serial port			\checkmark
	RF module		×	

BD1-28 series



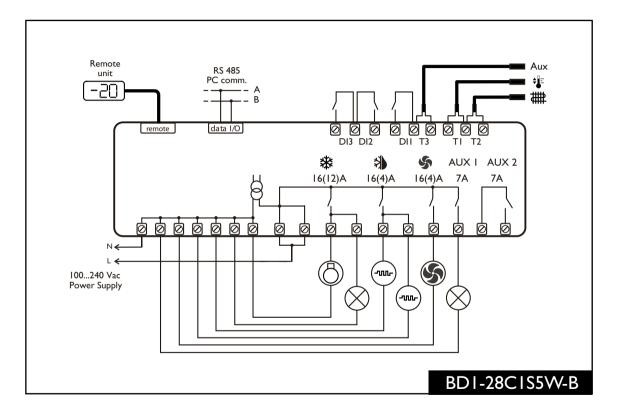
TECHNICAL DATA DUSS: RED LED DISPLAY UNIT

Dimensions: 77x35x20 mm (WxHxD)	Panel cut-out:	71x29mm
Front protection:		IP55

TECHNICAL DATA

Range:	-50÷110°C, -58180°F
Resolution:	0.1 / 1 °C; °F
Precision:	<±0.5°C within the measurement range
Sensor type:	NTC 10KΩ@25°C
Power supply:	100÷240Vac ±10% 50÷60Hz 3W

All models come with an alarm buzzer.



Upright refrigerators, plug-in and supermarket display cases, cold stores, control panels.



BD1-28 INSTRUC	TIONS FOR USE	PAR	RANGE	DESCRIPTION	EPT	0240 min	Eco pull-down time
Thank you for having chosen an LAE electronic product. Before installing the instrument, please read this instruction booklet		SPL	-50SPH	Minimum limit for SP setting.	SB	NO/YES	minutes. See Fig.3 Stand-by button ()
carefully in order to ensure safe installation and optimum perform DESCRIPTION	nance. INDICATIONS	SPH	SPL110°	Maximum limit for SP setting.	DSM	NON;	Door switch input m
DESCRIPTION		SP C-H	SPL SPH REF; HEA	Setpoint (value to be maintained in the room). Refrigerating (REF) or Heating (HEA) control mode.		ALR; STP	NON : door switch i ALR : when DIx=D
	 Thermostat output Fan output 	HY0	110°	Thermostat OFF -> ON differential.			STP : when DIx=D stopped and the co
	Parl output	HY1	010°	Thermostat ON -> OFF differential.	DAD	030 min	Delay before door of
	 Activation of 2nd parameter set 	CRT	030min	Compressor rest time. The output is switched on again after CRT minutes have elapsed since the	CSD	030 min	Compressor/heater
	Alarm			previous switchover. We recommend to set CRT=03 with HY0<2.0°.	D10	NON;	DI1 digital input ope
Fig.1 - Front panel [i ◆] Info / Setpoint button.	Manual activation / Increase button.	CT1	030min	Compressor/Heater output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.		DOR; ALR;	NON : digital input DOR : door input.
Manual defrost / Decrease button.	Exit / Stand-by button.	CT2	030min	Compressor/Heater output stop when probe T1 is faulty. With CT2=0 and CT1>0 the output will always be ON. <i>Example</i> : CT1=4, CT2= 6: In case of probe T1 failure, the compressor will cycle 4 minutes ON and 6 minutes OFF.		IISM;	ALR : when the in
INSTALLATION		DFM	NON;	Defrost start mode		RDS	defrosts are susper IISM : when the inp
The BD1-28 controller, size 107x95x47 mm (WxHxD), is to be	secured to a DIN rail in such a position as to ensure that no liquid		TIM; FRO	NON : defrost function is disabled <i>(the following parameter will be</i> FCM). TIM : regular time defrost.	D1A		RDS : when the inp DI1 digital input act
infiltrates causing serious damage and compromising safety.Make sure that electrical connections comply with the paragr				FRO : the defrost time count is only increased when the conditions occur for frost to form on the evaporator (optimised time increase).	DIA	OPN; CLS.	OPN : on open
disturbance, keep the sensor and signal cables well separate fro Place the probe T1 inside the room in a point that truly represent		DFT	099 hours	Time interval among defrosts. When this time has elapsed since the last defrost, a new defrost cycle is started.	D20	See D10	CLS : on close DI2 digital input ope
 Place the probe T2 on the evaporator where there is the maxin The function of probe T3 is determined by the parameter T3. W 	num formation of frost.	DFB	NO/YES	Defrost timer backup. With DFB=YES, after a power interruption, the timer resumes the count from where it was left off with ±30 min. approximation. With DFB=NO, after a power interruption, the defrost timer will	D2A	See DTO	DI2 digital input act
With T3=CND the probe measures the condenser temperature, unit. With T3=2EU the probe measures the temperature of the s	it must therefore be placed between the fins of the condensing			re-start to count from zero.	DZA	OPN; CLS.	OPN : on open
the maximum formation of frost. With T3 =NON, the third probe is		DLI	-50110°	Defrost end temperature.	D3O	NON;	CLS : on close DI3 digital input ope
OPERATION		DTO DTY	1120min OFF;	Maximum defrost duration. Defrost type		DOR; ALR;	NON RDS : See DSY : defrost syncl
DISPLAY During normal operation, the display shows either the temperature	re measured or one of the following indications:	DIT	ELE; GAS	OFF: off cycle defrost (Compressor and Heater OFF). ELE: electric defrost (Compressor OFF and Heater ON).		IISM; RDS;	in defrost will get de the others stopped.
dEF Defrost in progress	hP Condenser high pressure alarm		043	GAS: hot gas defrost (Compressor and Heater ON).		DSY.	the others stopped.
Controller in stand-by	 h, Room high temperature alarm Lo Room low temperature alarm 	DSO	OFF; LO;	Defrost start optimisation OFF : no optimisation.	D3A	OPN; CLS.	DI3 digital input act OPN : on open
h_{c} Door open alarm h_{c} Condenser high temperature alarm	E / Probe T1 failure E Probe T2 failure		HI	LO : defrost waits until the compressor cut-out. HI : defrost waits until the compressor cut-in.			CLS : on close
	E3 Probe T3 failure	SOD	030 min	Start optimisation delay.	LSM	NON; MAN;	Light control mode NON : light output r
INFO MENU		DPD	0240sec	Evaporator pump down. At the beginning of defrost, defrost outputs (determined by DTY) are OFF for		ECO; DI1;	MAN : light ouput c ECO : lights activat
The information available in this menu is:	<i>Lh</i> , Maximum probe 1 temperature recorded	DRN	030min	DPD seconds. Pause after defrost (evaporator drain down time).		DI2; DI3.	DIx : lights activate
<i>L ⊇</i> * Instant probe 2 temperature	Lo Minimum probe 1 temperature recorded	DDM	RT;	Defrost display mode. During defrost the display will show:	LSA	OPN;	Light activation (on
$E \mathcal{J}$ * Instant probe 3 temperature	Loc Keypad state lock		LT; SP;	RT: the real temperature; LT : the last temperature before defrost;		CLS	OPN : lights on with CLS : lights on with
*: displayed only if enabled (see §Configuration Parameters) **: o	displayed only if ACC > 0		DEF	SP : the current setpoint value; DEF : "dEF".	OA1	NON;	AUX 1 output opera
Access to menu and information displayed. ■ Press and immediately release button (i).	SETPOINT : display and modification ■ Press button (i) for at least half second, to display the	DDY	060min	Display delay. The display shows the information selected with parameter DDM during defrost and for		LGT; 0-1;	NON : output disab LGT : output enable
With button or select the data to be displayed.	setpoint value.	FID	NO/YES	DDY minutes after defrost termination. Fans active during defrost.		2CU; 2EU;	0-1 : the relay conta 2CU : output progra
 Press button i to display value. To exit from the menu, press button i or wait for 10 seconds. 	■ By keeping button i pressed, use button ♥ or ▲ to set the desired value (adjustment is within the minimum SPL and the	FDD	-50110°	Evaporator fan re-start temperature after defrost.		ALO; ALC	2EU : output enable ALO : contacts ope
 Reset of THI, TLO, CND recordings ■ With button ♥ or ▲ select the data to be reset. 	maximum SPH limit). When button (i) is released, the new value is stored. 	FTO	0120min	Maximum evaporator fan stop after defrost.			ALC : contacts mal
 Display the value with button (i). While keeping button (i) pressed, use button (ii). 		FCM	NON; TMP;	Fan mode during thermostatic control. NON : The fans remain ON all the time;	OA2	See OA1	AUX2 output opera
STAND-BY			TIM TIM	TMP : Temperature-based control. The fans are ON when the compressor is ON. When the compressor	2CD	0120 sec	Auxiliary compress seconds after the m
Button (1), when pressed for 3 seconds, allows the controller to be pu	t on a standby or output control to be resumed (with $BB=YES$ only).			is turned OFF, the fans remain ON as long as the temperature difference Te-Ta is greater than FDT. The fans are turned ON again with FDH differential. (Te = Evaporator temperature, Ta = Air temperature);	OS1	-12.512.5°	Probe T1 offset.
KEYPAD LOCK				TIM : Timed-based control. The fans are COMPR. COMPR. OFF COMPR. ON when the compressor is ON. When the COMPR. COMPR. OFF COMPR.	T2	NO/YES	Probe T2 enabling
The keypad lock avoids undesired, potentially dangerous operation a public place. In the INFO menu, set parameter LOC= YES to in				compressor is OFF, the fans switch ON and OFF according to parameteres FT1, FT2,	OS2	-12.512.5°	Probe T2 offset.
keypad, adjust setting so that LOC= NO.				OFF according to parameteres FT1, FT2, FT3 (See Fig.2).	Т3	NON; DSP;	Auxiliary probe T3 of NON : probe T3 no
SELECTION OF SECOND PARAMETER GROUP It's possible to select control parameters between two different	pre-programmed groups, in order for the fundamental control			Fig.2 Time-optimised fan control (FCM=TIM)		CND; 2EU	DSP : temperature CND : condenser te
parameters to be adapted quickly to changing needs. Changed MANUALLY by pressing button M for 2 seconds (with IISM= M	over from Group I to Group II (and vice versa) may take place	FDT	-120°	Evaporator-Air temperature difference for the fans to turn OFF after the compressor has stopped.	000	-12.512.5°	2EU : second evap Probe 3 offset.
(with IISM =ECO), or when IISM =DI, DxO =IISM and the digital ir If IISM =NON, switchover to Group II is inhibited. The activation	put is activated (the activation of DIx selects Group II, x=1,2,3).	FDH	112°	Temperature differential for fan re-start. Example: FDT = -1, FDH=3. In this case, after the compressor has stopped, the fans are OFF when Te	OS3 AHM	-12.512.5 NON;	Operation in case of
the controller display.	or Group in its signalled by the lighting up of the relevant LED on			> Ta - 1 (FDT), whereas the fans are ON when Te < Ta - 4 (FDT-FDH).	~	ALR; STP;	NON : high conden ALR : in case of ala
DEFROST		FT1	0180sec	Fan stop delay after compressor/heater stop. See Fig. 2			STP : in addition to t
 Automatic defrost. Defrost starts automatically as soon as the t <u>Timed defrost</u>. With DFM=TIM defrosts take place at regular in 		FT2	030min	Timed fan stop. With FT2=0 the fans remain on all the time.	AHT	-50110°	Condensation temp
with DFM =TIM and DFT =06, a defrost will take place every 6 hor <u>Optimized defrost</u> . With DFM =FRO the timer is only increased of		FT3	030min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.	TLD TDS	130 min T1;	Delay for minimum Selects the tempera
the time set with parameter DFT is matched. If the evaporator w climatic conditions. With setpoints much lower than 0°C, defrost		ATM	NON; ABS;	Alarm threshold management. NON : all temperature alarms are inhibited (<i>the following parameter will be</i> ACC).	100	1-2; T3	T1 : probe T1
 <u>Synchronised defrost</u>. With D3D=DSY and when more units controllers will take place. The first controller which will start defr 	s are linked to each other, synchronised defrosts of all linked		REL	ABS : the values programmed in ALA and AHA represent the real alarm thresholds. REL : the alarm threshold is obtained by the sum of setpoint, thermostat differential and ALR/AHR.			1-2 : the AVG-weigh T3 : probe T3
Defrost time count backup. At the power-up, if DFB=YES, the de	frost timer resumes the time count from where it was left off before	ALA	-50 110°	Low temperature alarm threshold.	AVG	0100%	The relative weight Example 1: T1 = -5
the power interruption. Vice versa, with DFB=NO, the time count r Manual or remote defrost start. It's possible to manually start a	a defrost, by pressing button () for 2 seconds, or defrost may be	AHA	-50 110°	High temperature alarm threshold.	0.01	400-	Example 2: T1 = -5
started remotely, if DxO =RDS, through the activation of the auxili Defrost type . Once defrost has started, Compressor and Defrost		ALR	-12 0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.	SCL	1°C; 2°C;	Readout scale. 1°C : measuring rai
the evaporator fans are active during defrost. Defrost termination . The actual defrost duration is influenced by	a series of parameters.	AHR	0 12°	High temperature alarm differential. With AHR=0 the high temperature alarm is excluded.		°F	2°C : measuring rai °F : measuring range
Time termination: T2=NO and T3 different from 2EU: the evap as time DTO.	orator temperature is not monitored and defrost will last as long	ATI	T1; T2; T3	Probe used for temperature alarm detection.	SIM	0100	Display slowdown.
 <u>Temperature monitoring of one evaporator</u>; T2=YES and T3 temperature DLI before the time DTO elapses, defrost will be ter 		ATD	0 120min	Delay before alarm temperature warning.	ADR	1255	BD1-28 address for
■ Temperature monitoring of two evaporators: T2=YES, T3=2E	J, AOx=2EU. This function is for the control of two independent	ACC	052 weeks	Condenser periodic cleaning. When the compressor operation time, expressed in weeks, matches the ACC value programmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is	Г		
evaporators and it switches off the individual heating of the evap- evaporator to get to that temperature before the time DTO elapse	25.		WEEKS	disabled and CND disappears from Info Menu.		X	l
Resuming thermostatic cycle. When defrost is over, if DRN is order for the ice to melt completely and the resulting water to dra		IISM	NON; MAN;	Switchover mode to second parameter set NON : inhibition to use the second parameter group (the following parameter will be SB).		Ì	
when the evaporator gets to a temperature lower than FDD; Vice versa, if probe T2 is not active (T2=NO) or after defrost has come to an end, such condition does not occur by end of the time FTO, after FTO minutes have elapsed the fans will be switched on anyway.			ECO; DI	MAN : button M switches the two parameter groups over. ECO : automatic switchover to the second parameter group, when ECO conditions are detected.		SP+HY0 -	
				DI : switchover to the second parameter group when DIx input is on.		SP-HY1 -	$\forall \forall \vee$
Caution: if DFM =NON or C-H =HEA all defrost functions are inhibited; if DFT =0, automatic defrost functions are excluded. During a high pressure alarm, defrost is suspended. During defrost, high temperature alarm is bypassed.		IISL	-50 IISH	Minimum limit for IISP setting.		0.1111	EPT
CONFIGURATION PARAMETERS		IISH	IISL 110°	Maximum limit for IISP setting. Setpoint in mode 2.	-		
 To get access to the parameter configuration menu, press butt 	on 例 + 订 for 5 seconds	IISP IIH0	1 10°	Setpoint in mode 2. Thermostat OFF->ON differential in mode 2.			
 With button V or last select the parameter to be modified. Press button I to display the value. 		IIH1	0 10°	Thermostat ON->OFF differential in mode 2.			
By keeping button i pressed, use button v or to set the d		IIDF		Time interval among defrosts in mode 2.			
 When button (i) is released, the newly programmed value is si To exit from the setup, press button (ii) or wait for 30 seconds. 	oreu anu trie ioilowing parameter is displayed.	IIFC	NON;TMP; TIM	Fan control in mode 2. See FCM.			
		ECS	15	Controller sensitivity for the automatic switchover from Group I to Group II (1=minimum, 5=maximum).			

e.	Only with IISM=ECO.	Group I parameters	are used in	regulation for at least EPT	
3					

on 🕑 enabling.

nput mode: witch inhibited

DIx=DOR and the digital input is on, an alarm is generated after ADO minutes blx=DOR and the digital input is on, in addition to the alarm, the fans are immediatel the compressor is stopped after CSD minutes. door open alarm warning

neater stop delay after door has been opened.

ut operation input 1 not active.

the input is on, an alarm is generated (if AHM=STP, the compressor is stopped and the suspended). he input is on, the controller will use group 2 parameters.

he input is on, a defrost is started (remote control).

ut activation.

out operation. See D10.

ut activation.

out operation : See D1O.

synchronization. The controllers will all start and end defrost together. The first controller get defrost of all the others started. The last controller ending defrost will get defrost of all pped.

ut activation

utput not controlled. uput controlled through button **M** (if OAx=LGT). activated/deactivated following the ECO state tivated/deactivated following the DIx state.

on (only with LSM=ECO or LSM=DIx). on with DIx open or ECO mode deactivated. on with DIx closed or ECO mode activated.

operation disabled (always off)

- t disabled (always off). enabled for light control. y contacts follow the on/standby state of controller. programmed for the control of an auxiliary compressor. enabled for the control of the electrical defrost of a second evaporator. cts open when an alarm condition occurs.
- ts make when an alarm condition occurs.
- operation. See OA1

pressor start delay. If OAx=2CU the auxiliary output is switched on with a delay of 2CD the main compressor has cut-in. Both compressors are turned off at the same time

bling (evaporator).

pe T3 operation

T3 not fitted.

rature T3 to be displayed. nser temperature measurement.

evaporator temperature measurement.

case of high condenser alarm

ondenser alarm inhibited.

or darm, "HC" flashes in the display and the buzzer is switched on. ion to the alarm symbols displayed, the compressor is stopped and defrosts are suspended. temperature alarm (referred to T3 probe).

mum temperature (TLO) and maximum temperature (THI) logging. mperature probe to be displayed.

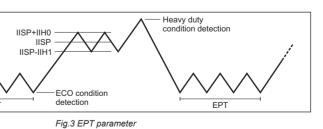
-weighted average between T1 and T2

veight of T2 on T1 (if TDS = 1-2) 1 = -5°, T2 = -20°, AVG = 100%. The displayed temperature will be -20° (T1 has no effect) 1 = -5°, T2 = -20°, AVG = 60%. The displayed temperature will be -14.

ring range -50...110°C (0.1°C resolution within -9.9 ÷ 19.9°C interval, 1°C outside) ring range -50 ... 110°C ng range -55 ... 180°F

own.

ess for PC communication.



TECHNICAL DATA Power supply

BD1-28....W

100-240Vac ±10%, 50/60Hz, 3W

Relay output max loads (240Vac)

	BD1-28S/T	BD1-28Q/R
Compressor	16A resistive 12 FLA 48 RLA	12A resistive 12 FLA 48 RLA
Evap. Fan	16A resistive 4 FLA 12 RLA	8A resistive 4 FLA 12 RLA
Defrost	16A resistive 4 FLA 12 LRA	16A resistive 4 FLA 12 LRA
Auxiliary loads 1	7A resistive	7A resistive
Auxiliary loads 2	7A resistive	7A resistive

Input NTC 10KΩ@25°C

LAE Part No. SN4...

Measurement Range

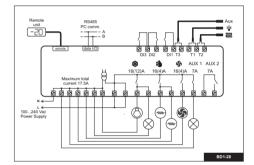
-50...110°C, -58...180°F -50 / -9.9 ... 19.9 / 110°C

Measurement accuracy <0.5°C within the measurement range

Operating conditions -10 ... +50°C; 15%...80% r.H.

CE (Approvals and Reference norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

WIRING DIAGRAMS





VIA PADOVA, 25 31046 ODERZO /TV /ITALY TEL. +39 - 0422 815320 FAX +39 - 0422 814073 www.lae-electronic.com E-mail: sales@lae-electronic.com BR1-28 107x95x47 MM DIN RAIL

CLEVER SPLIT DEFROST CONTROLLER WITH RTC

Up to 6 real time defrosts • Enhanced ECO Energy Saving management • Synchronised defrosts among more controllers • Optional control of a second compressor or evaporator • Up to 2 auxiliary outputs (Light, switched loads etc.) • Excellent evaporator fan control • Universal mains power supply • Optional power supply for refrigerated transports • Several alarm sources: temperature, door, condenser high temperature etc. • Quick programming through ZOT-BRI • Connection to LAE supervisory systems, including wireless option • Many display options: coloured LED's with DUSS or new high contrast LCD, fully customised

APPLICATIONS

Cold stores, control panels, upright refrigerators, plug-in and supermarket display cases, and all those plants where real time defrost starts are needed.

	Functions	BOQ3W-A	C1S4L-C	C1S5W-B
Temperature inputs	Thermostat	V	\checkmark	\checkmark
	Evaporator	\checkmark	\checkmark	\checkmark
	Auxiliary		\checkmark	\checkmark
DI1, DI2 digital inputs	Voltage free contact	\checkmark		
DI3 aux. digital input	Voltage free contact/ defrost synchronization		\checkmark	\checkmark
Outputs	Thermostat	\checkmark	\checkmark	\checkmark
	Evaporator fans	\checkmark	\checkmark	\checkmark
	Defrost	\checkmark	\checkmark	\checkmark
	Auxiliary 1		\checkmark	\checkmark
	Auxiliary 2			\checkmark
Connections	Quick with M/F connectors	\checkmark		
	Screw terminals		\checkmark	\checkmark
Power supply	100÷240Vac	\checkmark		\checkmark
	7÷30Vdc		\checkmark	
Aux functions	TTL serial port	\checkmark		
	RS485 serial port			\checkmark
	RF module		\checkmark	

BR1-28 series



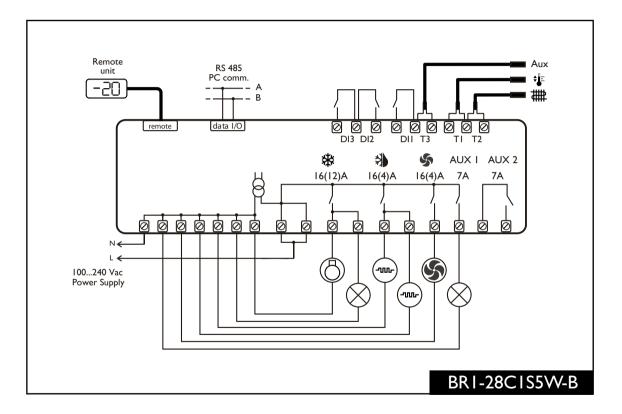
TECHNICAL DATA DUSS: RED LED DISPLAY UNIT

Dimensions: 77x35x20 mm (WxHxD)	Panel cut-out:	71x29mm
Front protection:		IP55

TECHNICAL DATA

Range:	-50÷110°C, -58180°F
Resolution:	0.1 / 1 °C; °F
Precision:	<±0.5°C within the measurement range
Sensor type:	NTC 10KΩ@25°C
Power supply:	100÷240Vac ±10% 50÷60Hz 3W

All models come with an alarm buzzer.



Cold stores, control panels, upright refrigerators, plugin and supermarket display cases, and all those plants where real time defrost starts are needed.



LCD-DISPLAY

New High Contrast Technology

- May be matched to the latest generation LAE controllers
- May be customised to suit specific aesthetical customer's needs.



MULTI-COMPRESSOR OR MULTI-FAN CONTROLLER

Four ON/OFF outputs for the control of single or multi-stage compressors or fans. Proportional output for speed control (inverters) • Output with change-over contacts for alarm control • Input for pressure transmitter (0/4...20mA) or for a temperature probe (NTCIOK) • Two digital inputs on voltage free contact for programmable function, up to three digital optocoupled voltage inputs for a complete system diagnostics • Selection of the control algorithm: rotation of outputs, sequential activation, optimisation of the available power • Pressure — Temperature conversion according to gas used • Storage of the latest nine alarms • Automatic maintenance management • II5Vac or 230Vac power supply by means of built-in transformer • Connections on screw terminals or quick connectors • DIN-Rail mount • Connection to supervisory PC.

APPLICATIONS:

for cryogenerators in supermarkets, cold stores and all cryogenic systems with variable demand.

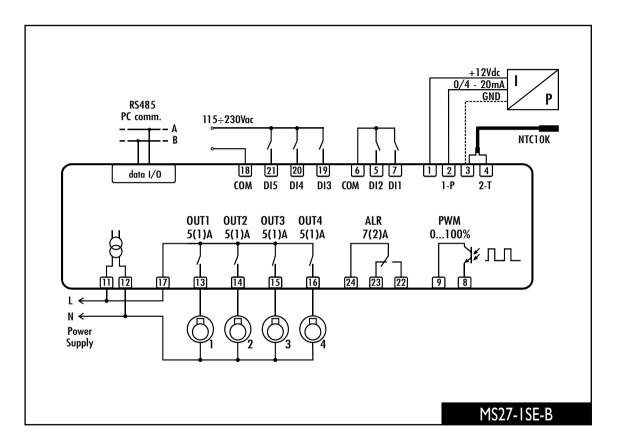


MS27: TECHNICAL DATA

Pressure input	type:	0/420mA
	range:	-1.045.0bar
	resolution:	0.1bar
	accuracy:	±0.2bar
Temperature input	type:	NTCIOK
	range:	-50.0120.0°C
	resolution:	0.5°C
	accuracy:	±0.5°C
Power supply	MS27E	230Vac±10%, 50/60Hz, 3W
	MS27U	115Vac±10%, 50/60Hz, 3W
Relay outputs	OUTIOUT4	5(1)A
	Alarm	7(2)A
Front protection		iP55

MS27 s	eries
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	Functions	-10E-B	-1SE-A	-1SU-B
Connections		\checkmark	\checkmark	
	Quick on M/F terminals	\checkmark		
Power supply	230Vac	\checkmark	\checkmark	
	115Vac			\checkmark
Serial port	Π		\checkmark	
	RS485	\checkmark		\checkmark



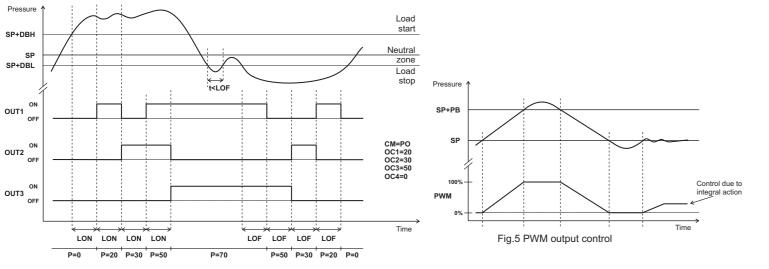
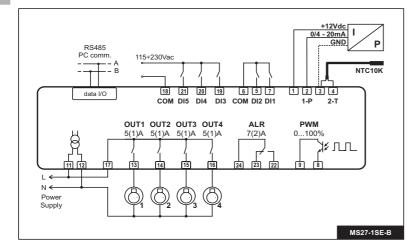


Fig.4 Control by optimisation of the available power

WIRING DIAGRAMS



TECHNICAL DATA

Power supply

MS27...E 230Vac+10% 50/60Hz 3W MS27...U 115Vac±10%, 50/60Hz, 3W

Relay outputs

OUT1...OUT4 7(2)A Alarm

Pressure input

0/4...20mA type: -1.0...45.0bar range: resolution. 0.1bar

Temperature input

	· · ·
type:	NTC10K (LAE SN4)
range:	-50.0120.0°C
resolution:	0.5°C (-20.080.0); 1°C out of that range

Operating conditions

-10 ... +50°C; 15...80% r.H.

CE (Reference norms)

EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1

Front Protection IP55



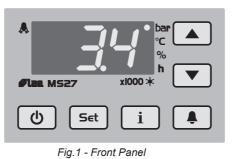


www.lae-electronic.com E-mail: sales@lae-electronic.com

MS27 INSTRUCTIONS FOR USE

Thank you for having chosen an LAE electronic product. Before installing the instrument, please read this instruction booklet carefully in order to ensure safe installation and optimum performance.

DESCRIPTION



INSTALLATION

The controller, size 71x97x61 mm (WxHxD), is to be secured to a DIN rail in such a position as to ensure that no liquid infiltrates causing serious damage and compromising safety. Make sure that electrical connections comply with the paragraph "wiring diagrams". To reduce the effects of electromagnetic disturbance, keep the sensor

and signal cables well separate from the power wires.

Connect a pressure transmitter with output 0/4..20mA to input 1-P. Whenever control takes place through temperature, connect an NTC10K probe (part No. LAE SN4...) to input 2-T.

OPERATION

DISPLAY

Parameter INP selects the input used for control.

■ INP=1-P: Input 1-P (0/4...20mA) is used to control pressure. In the setup the parameters relating to the variable to be controlled (SPL, SPH, SP,...) are expressed in bar. In normal mode, the display shows the pressure measured in bar, or the corresponding temperature in °C, calculated according to the refrigerant gas used (see REF). Input 2-T is disabled.

■ INP=2-T: Input 2-T (NTC10K) is used for temperature control. In the setup the parameters relating to the variable to be controlled (SPL, SPH, SP,...) are espressed in °C. In normal mode the display shows the temperature measured in °C, or the corresponding pressure calculated in bar. Input 1-P is disabled. In normal mode it's also possible to display the percentage of available power used. To modify the type of display, press 🔊 or 🛋 The following indications may also appear:

oFF	Controller in stand-by	
or	Over range or probe failure	1
hР	High pressure alarm	
LP	Low pressure alarm	
oiL	Low compressor oil alarm	

INFO MENU

To have access to the info menu, press button (i). The available info is:

ou!4	Output 14 state / hours of operation
. h.	Max. input value measured.

Access to menu and information displayed.

- With button ♥ or ▲ select the data to be displayed;
- Press button i to display the value;
- To exit from the menu, press button () or wait for 10seconds

■ While holding down button (i), press button (ii) to display the hours of Reset of hours of operation of out1...out4 outputs and of IHI, ILO recordings operation (multiplied by 1000); the "h" LED blinks.

- With buttons 🖲 or 🔺 select the data to be reset;
- Press button i to display the value;
- While keeping button i pressed, use button .

SETPOINT (display and modification of desired pressure/temperature value)

- Press button set for at least half second, to display the setpoint value;
- If the second setpoint has been enabled (see DI1, DI2), before its value appears, the display shows "2SP";
- By keeping button (Set) pressed, use button (or) to set the desired value (adjustment is within the minimum SPL and the maximum SPH limit).
- When button Set is released, the new value is stored.

ALARM MENU

The last nine alarms can be displayed in the alarm menu, from the most recent AL1, to the least recent AL9.

Access to menu and display of stored alarm.

- Press button (4);
- With button or select the data to be displayed;
- Press button (1) to display the alarm type;
- To exit from the menu, press button () or wait for 10 sec.

STAND-BY

Button () when pressed for 3 seconds, allows the controller to be put on a standby or output control to be resumed (with SB=YES only).

KEYPAD LOCK

The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controller is operating in a public place. In the INFO menu, set parameter LOC=YES to inhibit all functions of the buttons. To resume normal operation of keypad, adjust setting so that LOC=NO.

5(1)A

INDICATIONS

bar Pressure display in bar	b Stand-by button
°C Temperature display in °C	Set Setpoint button
% Percentage of use of available power	i Info button
h Hours of operation (LED lit)	Alarm display button
xl000 Thousands of hours of operation (LED blinking)	Increase button
🜲 Alarm	Decrease button

LL Low refrigerant level alarm

- RL Generic alarm
- h_{I} High measured value alarm
- Lo Low measured value alarm

 $\vec{n} \not\models \vec{n}$ Periodic maintenance warning

 l_{\Box} Min input value measured.

Loc Keypad state (lock)

Display of hours of operation of out1...out4 outputs

■ With button or select the output;

■ Display the ON/OFF state of output by pressing button (i);

■ While holding down button ①, press button to display the hours of operation; the "h" LED is lit.

■ Warning: the hours of operation of stages are not stored, '---' is displayed

Reset of all stored alarm.

- Press button (1) to display the type of any alarm in the list;
- By keeping button ④ pressed, press button ④ for 1 second, until the inscription 'non' appears.

CONTROL

OUTPUT CONFIGURATION

Outputs are configured with parameters **OC1**, **OC2**, **OC3**, **OC4**. Parameter **OCx** controls the operation of output OUTx: **OCx**=1...100 indicates the power in percentage over the total power, of the compressor connected to OUTx. With **OCx**=-1, output OUTx is associated to a stage, which is active when the relay is closed. With **OCx**=-2, output OUTx is associated to a stage, which is active when the relay is open. With **OCx**=0, output OUTx is not used for control. *Warning:* the output associated to the compressor motor must always be wired in the terminals located before the terminals where the outputs controlling the stages are. Example: in a system with two compressors of different power (the first with 60% of total power, the second with 40%), each compressor having a stage, the configuration of outputs is as follows: **OC1** = 60, OUT1 is connected to the motor of compressor 1 of power equal to 60% of total power. **OC2** = -1, OUT2 is connected to the stage of compressor 1, the stage is active when the relay is closed. **OC3** = 40, OUT3 is connected to the motor of compressor 2 of power equal to 40% of total power. **OC4** = -1, OUT4 is connected to the stage of compressor 2.

CONTROL ALGORITHM

Parameter CM provides the control algorithm.

• **CM**=ROT: rotation of outputs of equal power. This algorithm minimises the number of starts/stops per hour of each load. When the system calls for more power, the output which has been off for longer will be activated. When demand for power decreases, the output which has been on for longer will be switched off. When an output remains active for more than LRT minutes, the controller looks for an inactive output fulfilling the requirements to be activated (less hours of operation, minimum off time elapsed,...) and the rotation of the two outputs will take place. In this way, an equal sharing of the total operation time among all loads will be achieved (see Fig. 2). Note:the compressor rotation algorithm assumes that compressors have got an equal power. In this case, parameter **OCx** is used only to define if output OUTx either controls a compressor or a stage. So, if the value is positive, it will have no effect on **OCx**, regardless of what you program. Example: in a system consisting of four compressors, each will have a power equal to 25% of the total value, regardless of the value programmed to **OCx**.

CM=SEN: sequential activation of the enabled outputs. The outputs are switched on/off with fixed sequence, from output 1 to output 4 (see Fig. 3).

• CM=PO: optimisation of the available power. The controller combines the outputs in such a way as to obtain a fine control, both in case of calls for more power and less power. Example: OC1=10, OC2=20, OC3=30, OC4=50. If a capacity of 90 is required, outputs OUT1, OUT3, OUT4 (10+30+50) are switched on. If a capacity of 50 is required, outputs OUT2 and OUT3 (20+30) are switched on (see Fig. 4).

CONFIGURATION PARAMETERS

- To get access to the parameter configuration menu, press button (Set) + (0) for 5 seconds;
- with button or select the parameter to be modified;
- press button (Set) to display the value;
- by keeping button Set pressed, use button T or A to set the desired value;
- when button set is released, the newly programmed value is stored and the following parameter is displayed;
- to exit from the setup, press button () or wait for 30 seconds.

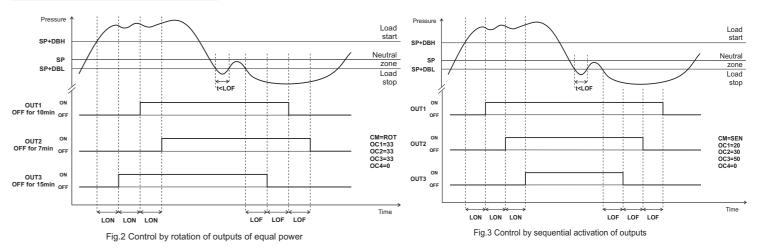
Note: re-programming some parameters causes a complete re-configuration of the controller operation. So please put the controller on stand-by, if you have to modify the parameters relating to the output configuration or the selection of the control algorithm.

(In the parameter description, we refer to 'pressure control'. In case of temperature based control, please replace the word 'pressure' with 'temperature' and 'bar' with '°C').

	PAR	RANGE	DESCRIPTION				
	INP	1-P, 2-T		trol for pressure control; input 2-T is disabled. for temperature control; input 1-P is disabled.			
	MPI	0MA, 4MA	Min. current input range. 0MA : input 020mA; 4mA : input 420mA Min. scale range. RLO takes the minimum value measured by the transmitter (corresponding to 0/4mA).				
NP=1-P	RLO	-1.0RHI bar					
	RHI	RLO45.0bar	Max. scale range. RHI takes the maximum value measured by the transmitter (corresponding to 20mA).				
	OS1	-12.012.0bar	Probe offset				
	REF	404,507,22,134		ows Pressure - Temperature conversion. I7, 22 =R22, 134 =R134A			
	SPL	RLOSPH	Minimum limit for SP	and 2SP setting			
	SPH	SPLRHI	Maximum limit for SP	and 2SP setting			
SP SPLSPH Main setpoint, indicates the pressure to be maintained.				es the pressure to be maintained.			
	2SP SPLSPH		Alternate Setpoint. Pressure refence point is 2SP if DI1 (DI2) = 2SP and the corresponding input is active.				
	DBL -10.00.0		Lower neutral zone.	The state of outputs remains unchanged as long as pressure is within the band SP+DBL			
	DBH	0.010.0bar	Higher neutral zone.	and SP+DBH.			
			Load start delay. Pressure must remain higher than SP+DBH for LON seconds before the next load is switched on.				
	LOF	0250s	Load stop delay. Pressure must remain lower than SP+DBL for LOF seconds before the next load is switched off.				
:	SON	0250s	Stage start delay. Pressure must remain higher than SP+DBH for SON seconds before the next stage is switched on.				
	SOF	0250s	Stage stop delay. Pressure must remain lower than SP+DBL for SOF seconds before the next stage is switched off.				
	РВ	020.0bar	Proportional band (PWM output control, see Fig. 5). Zone above setpoint in which the PWM output is activated proportionally. <i>Example</i> : pressure < SP, PWM=0%; pressure=SP+PB/2, PWM=50%; pressure>SP+PB, PWM=100%.				
	IT	0250s		ontrol of PWM output, see Fig. 5). .e, a more stable control takes place.			
	СМ	ROT, SEN, PO	Selection of control algorithm. ROT : rotation of equal power outputs. SEN : sequential activation of outputs. PO : optimisation of available power.				

OC1, OC2, OC3, OC4	-2100	Control of output 1, 2, 3, 4. 1100 : power (percentage of total) of the load 0 : output OUTx not used; -1 : output OUTx connected to a stage, which is -2 : output OUTx connected to a stage, which is			
MLS	030min	Minimum off time of loads. Minimum time which must elapse between whe			
LRT	0120min	Time of forced rotation of loads (only with CM= This parameter, if greater than 0, provides the account the possibility of rotation of two outputs			
DPU	0120min	Start delay. Delay between the time when the controller is compressor crankcases to warm up.			
SCD	0100 %	Down Scaling. It indicates the maximum per cent power usable			
ALA	RLOAHA	Low value measured alarm threshold.			
AHA	ALARHI	High value measured alarm threshold.			
AID	0120min	High/Low alarm delay.			
D1M D2M	NON, SBY, 2SP, ALR	Function of digital input DI1, DI2. NON : input disabled; SBY : when input DI1 (DI2) is active, the control 2SP : when input DI1 (DI2) is active, the control ALR : when input DI1 (DI2) is active, the control ALR, to load to be switched off and control to be control automatically (automatic reset).			
D1C D2C	OPN, CLS	Activation of digital input DI1, DI2. OPN: active input is open; CLS: active input is closed			
DxM	NON,HP, LP, OIL, LL, ALR	Function of digital input DI3, DI4, DI5. NON: input disabled. HP: high pressure alarm. refrigerant level alarm. ALR: generic alarm.			
DxC	OPN, CLS	Activation of digital input DI3, DI4, DI5 (see D1			
DxD	0120min	Activation delay of alarm DI3, DI4, DI5. The digital input must remain in the activation of			
DxA	DSP, SAR, SMR	Reaction following alarm DI3, DI4, DI5. DSP: alarm display. SAR: in addition to the alarm displayed, a dow alarm is over, the controller resumes output cor SMR: in addition to alarm displayed, all loads a control is resumed but only after the alarm has			
МТС	0600 (x100hours)	Maintenance. When the operation hours of any load achieve th this warning, after performing maintenance, res			
SB	NO/YES	Stand-by button enabling.			
TLD	130min	Delay for min / max input loggin.			
SND	NO/YES	Alarm buzzer enabling			
ADR	1255	MS27 address for PC communication.			

OPERATION EXAMPLES



d connected to output OUTx (x=1, 2, 3, 4);
s activated when the contact is closed. s activated when the contact is open.
en the load is switched off and when it's switched on again. ROT). The operation time of a load after which the controller takes into ts.
is switched on when the outputs are activated, in order for the
le during an alarm with enabled down scaling action.
oller is put on a stand-by. I setpoint is 2SP. roller detects a generic alarm which causes the display to show be stopped. When the alarm is over, the controller resumes output
n. LP: low pressure alarm. OIL: low compressor oil level. LL: low
condition for this time before the alarm is detected.
wn scaling (SCD) is activated and control is stopped. When the introl automatically (automatic reset). are switched off and control is stopped. When the alarm is over, seen acknowledged by pressing button (a) (manual reset).
his value, a maintenance warning will flash on display. To eliminate st the hour counters as described in paragraph "info menu".

TMR15

77х35х77 мм

COUNTDOWN TIMER

Panel timer • Countdown in hours and minutes or minutes and seconds • Manual start/ stop of countdown • Remote start of countdown • Manual switching on/off of output • Mains powered • Buzzer to warn countdown end • Keypad lock option.

APPLICATIONS:

Control of duration of industrial processes, control of dough retarders, control of cooking time in ovens.

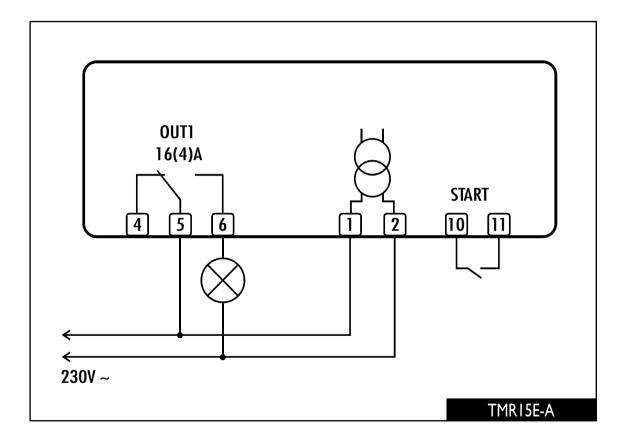


Standard versions	Power supply	Buzzer
TMR15E	230Vac ±10%, 3W	
TMR15E-A	230Vac ±10%, 3W	\checkmark
TMR15D-A	12Vac/dc ±10%, 3W	\checkmark

Versions with 110V supply are also available.

TECHNICAL DATA

Outputs:	Out 16(4)A 240V~
Power supply:	230Vac ±10% 3W
Front protection:	IP55
Panel cut-out :	71x29 mm



Control of duration of industrial processes, control of dough retarders, control of cooking time in ovens.





TMR15 INSTRUCTION FOR USE

Thank you for having chosen an LAE electronic product. Before installing the instrument, please read this instruction booklet carefully in order to ensure safe installation and optimum performance. DESCRIPTION

Ō out Fig.1 - Front panel

INDICATIONS

100 Manual mode Θ Timer started h•mm Hours-minutes scale Minutes-seconds scale m•55 out Output active \blacksquare Increase button Manual mode button.

INSTALLATION

Start/Stop button

Decrease button

C

The TMR15, size 77x35x77 mm (WxHxD), is inserted into the panel through a hole measuring 71x29 mm and is fixed by means of the suitable clips, by pressing gently. If fitted, check that the rubber gasket adheres to the panel perfectly, in order to prevent debris and moisture infiltration to the back of the instrument.

The instrument should work with room temperatures between -10°.. +50°C and relative humidity between 15%...80% inclusive. Supply voltage, switched powers and connection set-up should scrupulously comply with the indications given on the container. To reduce the effects of electromagnetic disturbance, keep the sensor and signal cables well separate from the power wires.

OPERATING MODES

The TMR15 features two main operating modes: Normal and Manual; when the unit is powered, its software loads the operating mode active before the TMR15 was switched off.

NORMAL MODE

In the STOP state, the output is off and the display shows the programmed cycle time. Pressing the button () or making the remote start contact causes the output to be switched on and the display shows the countdown time. During the countdown, by pressing the buttons (), the total cycle time is displayed. By pressing () it's possible to quit the program and switch over to the STOP state at any time. In case of a power failure, the timer always resumes the STOP state.

MANUAL MODE

Pressing the button 🖄 for 3 seconds activates the manual mode, with the buttons < and 🕨 you choose the permanent state of the output (On/OF). This operating mode and the associated state are stored and maintained even in case of power failure. To exit and revert to normal mode, press response on a second s.

CYCLE TIME SETTINGS

From the STOP state it's possible to program the time by pressing 🕢 or 🕨 till you obtain the desired value. Autoscaling in minute/seconds and hours/minutes takes place automatically, the respective two dots on the display show the scale active, in other words: 9 minutes and 59 seconds and 9 hours and 99 minutes. Exit from the programming is automatic after 5 seconds of not using the keypad or immediate by pressing

SETUP

The setup is accessed by pressing and keeping the buttons + pressed for 5 seconds. The available parameters appear in the table here below. Press button to pass from one parameter to the next, viceversa press the button to go back. To display the value of a parameter press , to modify it press + or simultaneously. Exit from the setup is either by pressing or automatic after 20 seconds of not using the keypad.

Par	Adjustment	Description
ALR	YES/NO	Buzzer enabling
LOC	YES/NO	Keypad lock
ADR	1255	Peripheral address

AUXILIARY FUNCTIONS

MANUAL MODE

The keypad lock avoids undesired, potentially dangerous operations, which might be attempted when the controller is operating in a public place. From the Setup it's possible to assign YES or NO to the parameter Loc. With LOC=YES all keypad commands are inhibited, countdown START therefore takes place through remote command only. To resume normal keypad operation, just re-program LOC=NO.

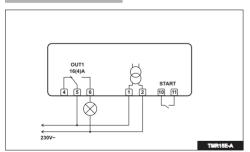
BUZZER

The TMR15 can be fitted with a buzzer to warn that the cycle has come to an end, this function is active with ALR=YES.

BUZZER

The TMR15 can have an optional serial port for connection to a PC or programmer. In the first case it is important to assign to the parameter ADR a different value for each linked unit (peripheral address); with automatic programming, **ADR** should remain on 1.

WIRING DIAGRAM



TECHNICAL DATA

Power supply 230Vac±10%, 50/60Hz, 3W Relay output 16(4) 240 **Operating conditions** +50° -10 CE (Reference Norms) EN60730-1; EN60730-2-9; EN55022 (Class B); EN50082-1 Front protection IP55

WARRANTY

LAE electronic SPA guarantees its products against defects due to faulty materials or workmanship for one (1) year from the date of manufacture shown on the container. The Company shall only replace products which are shown to be defective to the satisfaction of its own technical services. The Company shall not be under any liability and gives no warranty in the event of defects due to exceptional conditions of use, misuse or tampering. LAE electronic does not accept units back unless LAE electronic has previously given its allowance or request.

TAB Monitoring, Logging and Programming Software

Wireless Plant Monitoring

WBS-0 | WEB SERVER

DL28W Flexible Data Logger

TAB Monitoring, Logging and Programming Software

Overall plant monitoring • Compatible with the wireless communication system • Storage of temperature, humidity, pressure, alarms • Display and printing in numerical and graphic form of stored data • Export of stored data for Excel* or others • Diagnostics with dynamic graphs of all analog inputs • Virtual instrument for analysing the system and setting regulator parameters • Automatic sending or on demand of SMS to trace alarm status • Connection to remote PC for tele-servicing via Internet • Several languages available: English, German, Italian, Spanish, Polish etc.

Supermarket "Frence" Ltd. M. Bournette S Dutord ph.89-546320 - fax.89-687	Street 69 1527	_			atae.	Cold room Pro		Beda Q'CH BA
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AVAILABLE OPTIONS

Available as full optional as described above but also in a "low cost version" for data logging only. This version is called TABLV

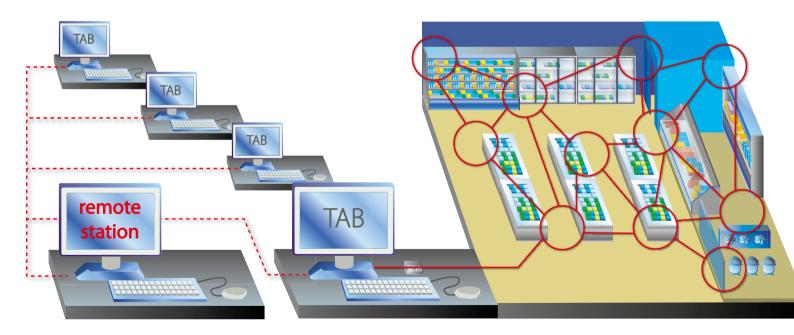


MINIMUM SYSTEM REQUIREMENTS

- Computer with Windows XP/Vista/7* operating system installed and properly running, minimum processor and memory as required from Windows* version – USB port – Mouse – CD-ROM drive
- 1024x768 pixel screen resolution, 16-bit colour
- IGB available on Hard Disk
- RS232 serial port (COM); an additional port is required if a GSM modem is fitted
- In case of wireless communication with the controllers, modules SWB-C and SWB-R are needed. Alternatively, an RS232-RS485 converter mod. SBC485 has to be fitted in case of a hard-wired system.
- GSM modem for sending SMS

APPLICATIONS

Supervision of the refrigeration process in supermarkets, convenience stores, shops, petrol stations, large kitchens, food factories, cruise ships etc.



Wireless Plant Monitoring



HE LAE ELECTRONIC WIRELESS COMMUNICATION SYSTEM, COMBINED WITH THE TAB SUPERVISORY SOFTWARE, ALLOWS EQUIPMENT RUN BY LAE CONTROLLERS TO BE MONITORED EASILY WITHOUT THE NEED OF A HARD-WIRED CABLE. THIS SYSTEM WILL BE PARTICULARLY USEFUL IN SUPERMARKETS AND KITCHENS WHERE THE LAYING OF WIRES IS COSTLY AND DIFFICULT, BOTH FOR NEW AND EXISTING UNITS. THE SWB MODULES DEVELOPED BY LAE ELECTRONICS, ALLOW ALL

THE LAE CONTROLLERS FITTED WITH A TTL OR RS485 PORT TO BE

INCORPORATED INTO SUCH A SYSTEM.

The plant supervisory PC, running the TAB software, is connected via an SWB-C version of the module allowing communication to all controllers within the wireless network

The controllers use the SWB-R module version, so that once connected they will automatically become part of the network.

EASY-TO-INSTALL AND POWERFUL

The radio communication protocol used, allows a "mesh" type wireless communication network to be created. This means that the data may reach even the furthest controller via SWB-R modules linked through the intermediate controllers. In this way, the actual creation of a network is greatly simplified. To add a controller to an existing network, you just have to ensure it is within 30-40m of an individual module. If there are no SWB-R modules within communications range, a stand-alone SWB-R can be powered up half way, to boost the signal and bridge the gap. This style of network can easily cover even vast areas with controllers separated by long distances.

SAFE AND RELIABLE

Once that the installation procedure has been performed successfully, the network consisting of SWB modules will automatically close the access to any other foreign wireless device which may work on the same radio channel. In this way no interference and intrusions of any type are possible and therefore data reliability and integrity are ensured.

FLEXIBLE

The SWB modules may be used to create a fully wireless network (a module for each controller); to connect segments of a cabled RS485 line to the wireless network (more controllers with RS485 port connected to an SWB-R module), or to add individual controllers to an existing network without laying additional cables.

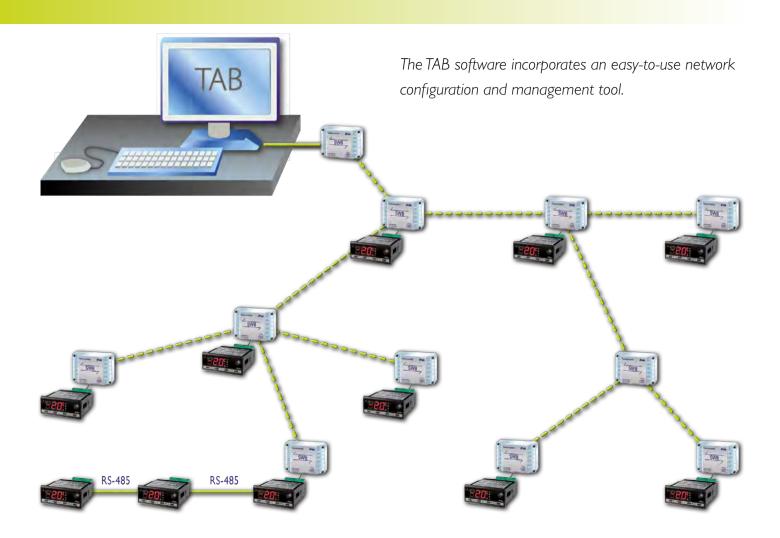


TECHNICAL SPECIFICATIONS OF SWB MODULES

- 🥊 Radio frequency band: ISM 2.4GHz
- Range: up to 40m indoor with obstacles
- Serial port SWB-C: RS232 on DB-9 connector SWB-R: selectable TTL/RS485, on Ampmodu II 4-way connector
- Max. number of peripherals on RS485 port: 63
- 🥊 LED's: power supply / associated to network, serial port transmission, serial port receive
- Power supply: 230Vac/3W
- 🥊 Dimensions: 1 10x75x53 mm

COMPONENTS OF THE SYSTEM TO BE ORDERED

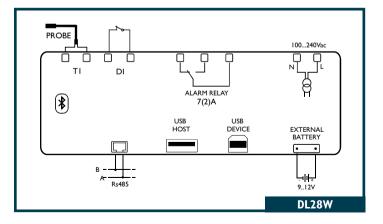
- 🥊 TAB software
- 🥊 SWB-C module, PC side
- SWB-R modules (one for every controller or one for every "x" controllers wired with each other through the RS485 serial line)
- Connection cable from SWB-C module to a PC
- Connection cable from SWB-R module to a controller



DL28W Flexible Data Logger

- Recording of temperatures and states such as defrosts, alarms etc.
- It may work both as a stand alone and as a unit collecting data from LAE controllers connected to it.
- Recorded data may be downloaded through PC, USB, Bluetooth®
- Universal mains power supply
- Optional power supply for refrigerated transports
- Continuity of operation in case of power failure through internal or external backup battery
- Relay output for remote alarm
- PC software for data logger configuration and display of recordings on graph or Excel tables





APPLICATIONS:

HACCP, plant diagnostics, alarm event recording.

TECHNICAL DATA

	Tubo	NTC 10KΩ @ 25°C
Temperature Input	Туре	Ŭ
	Range	-50 110°C
	Accurancy	<0.5°C
Output	Max. Load	5(1)A; 240Vac
Max. No. of devices connected		4 devices through RS485
Internal Mass Memory		4 MByte
Bluetooth	Specification compliant	V2.1 - V3.0
	Range	class-2
USB	Connection Type	A2.0, B2.0
Internal backup battery		>20 day, self-rechargeable
	Voltage	712V
External Battery	Consumption	75mAh
	Connector	XAP-02V-1 (JST)
Power supply		100240 Vac, 50/60 Hz, 3W
Operating Conditions		-10 +50°C; 15% 80% r.H.

WBS-01 Web Server

THE WBS-01 IS A COMPLETE AND INTEGRATED WEB-BASED SOLUTION FOR REMOTE MONITORING, DATA LOGGING AND ALARM MANAGEMENT IN PLANTS WHERE LAE ELECTRONIC CONTROLLERS ARE FITTED.

The incorporated web server grants access to the measured values, to the configuration parameters of controllers, to the alarm states, to recorded data and to configuration of the VBS-01 through an ordinary browser.

Various users may be enabled to get access to the system with different rights and each of them can receive recorded data and alarm messages to his/her e-mail address.

Configuration is extremely easy and quick to make thanks to the templates for various controllers that LAE makes available and thanks to the automatic detection of the connected devices.



In the event that an Internet access is not available, remote connection may take place even through GSM/GPRS with the addition of an external modem, which will also send out SMS messages.

Furthermore, it's possible to use the online netbiter.Net portal offering data collection and storage, graph representation, parameter programming and alarm management services and it makes these functions available through a simple link to just one website.

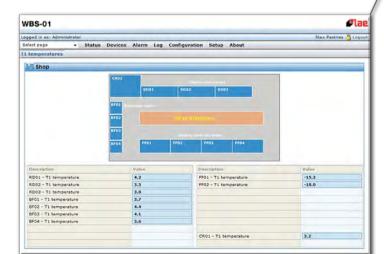
In this way there will be no need for a static IP address, a firewall configuration modification or the use of a specific SIM card for GSM/GPRS connection, moreover a centralized management of more plants will turn out to be easier.

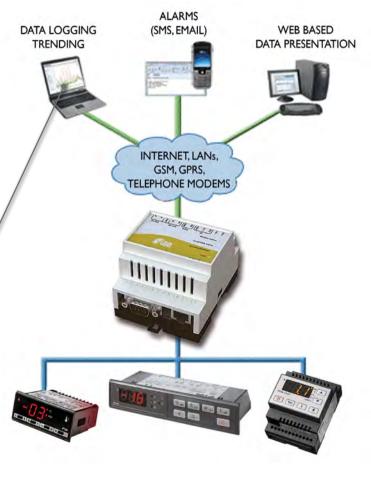
MAIN FEATURES

Built-in web server for accessing device data and configuration • Data logger with graph representation and data export in text format • Alarm management with list of current events, list of stored events, e-mail or SMS sending • Management of several users with different access rights and alarm messages reception • Simplified configuration through templates of LAE controllers and automatic detection of the connected devices • Communication ability in absence of Internet line and SMS sending by connecting an external analog or GSM/GPRS modem • Ability to get access to data through Internet portal • 2 digital inputs that may be monitored and controlled as external alarm sources.

TECHNICAL DATA

Ethernet port::	10/100 Mbit/s, RJ45 connector
Serial port #1:	RS-485, screw terminal
Serial port #2:	RS-232 DSUB 9-pin connector
Power supply:	9÷24V AC/DC 2W
Operating temperature:	-40÷65°C
Housing:	DIN rail, 4 modules, 90x70x58mm
Certification:	EN 61000-6-2:2005 and 61000-6-4:2001, UL 508





TEMPERATURE PROBES

SN2B..P

Sensor type:	NTC2K, 2000Ω @ 25°C
Range:	-40÷120°C
Accuracy:	±0.3°C @ 25°C
Sheath:	Ø6x29mm;TPE
Cable:	2 wires x 0.35mm ² ; -40÷ I 20°C;TPE; points
Protection:	IP67

SN4B..P

Sensor type:	NTC10K, 10000Ω @ 25°C
Range:	-40÷120°C
Accuracy:	±0.3°C @ 25°C
Sheath:	Ø6x29mm; TPE
Cable:	2 wires x 0.35mm ² ; -40÷120°C;TPE; points
Protection:	IP67

STIK..C/P

Sensor type:	KTY81-121, 990Ω @ 25°C
Range:	-40÷105°C
Accuracy:	±1.5°C@25°C
Sheath:	Ø6x34mm;TPE
Cable:	2 wires x 0.35mm ² ; -40÷105°C;TPE; connector or points
Protection:	IP67



HUMIDITY TRANSMITTERS

HT2WAD

Sensor type:	Capacitive
Output signal:	0÷1Vdc
Range:	0%÷100%r.H
Accuracy:	±5%r.H. (25%÷75%r.H.)
Sheath:	Ø14x40mm
Protection:	IP65 (electronics)
Operating temperature:	0÷75°C (sensor) / 0÷50°C (electronics)
Dimensions of the enclosure:	I I 0x53x75mm (electronics)
Power supply:	l 2Vdc, 0.2W



PRESSURE TRANSMITTER

PGT35

Sensor type:	Piezoresistive gauge
Output:	4÷20mA
Range:	-0,5÷35,0 bar
Accuracy:	max±1%FS (0÷50°C)
Sheath:	Ø17x58 mm
Connections:	mPm connector
Pressure port:	7/16"-20UNF male, steel AISI 316L
Protection:	IP65
Ambient temperature:	-40÷100°C
Power supply:	8÷32Vdc

TEMPERATURE PROBES

Pt | 00

SPIN..P-X

Sensor type:	Pt100 class "B" (DIN 43760), 100Ω @ 0°C
Range:	-40÷120°C
Accuracy:	±0.3°C (0÷60°C)
Sheath:	Ø6x70mm; stainless steel
Cable:	3 wires x 0.22mm2; -40÷120°C; PETE; points
Protection:	IP67

SPTO

Sensor type:	Pt100 class "B" (DIN43760), 100Ω @ 0°C
Range:	0 ÷400°C
Accuracy:	± 0.3 °C or ± 0.5 °C (in the worst case scenario)
Response time:	10 seconds in water
Sheath:	Ø6x I 60mm; stainless steel AISI3 I 6
Cable:	3 wires x 0.24mm2; L=100cm, fiber glass, points
Protection:	IP65

Thermocouples

TJ.ECO

Sensor type:	thermocouple
Range:	0 ÷450°C
Accuracy:	± 2.5 °C or ± 0.75 % (in the worst case scenario)
Response time:	10 seconds in water
Sheath:	Ø6x I 60mm; stainless steel AISI3 I 6
Cable:	2 wires x 0.50mm2; L=300cm, fiber glass, points
Protection:	IP65

TK.ECO

Sensor type:	k thermocouple
Range:	0 ÷ 600°C
Accuracy:	± 2.5 °C or ± 0.75 % (in the worst case scenario)
Response time:	approx. 2 seconds in water
Sheath:	Ø4.5x I 60mm; INCONEL600
Cable:	2 wires x 0.24mm2; L=300cm, fiber glass, points
Protection:	IP65