

BR5-A 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.

1. 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.
- 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.
- The function of probe T3 is determined by the parameter T3.
- At the first power up, set the real time clock (MIN, HRS).

2. DISPLAY INFO

Alarm	h ₁	Room high temperature alarm
Compressor output	L ₀	Room low temperature alarm
Fan output	h _c	Condenser high temperature
Defrost output	RL _r	Digital input alarm
Activation of 2 nd set	c _L	Condenser clean warning
Controller in stand-by	E ₁	Probe T1 failure
Defrost in progress	E ₂	Probe T2 failure
Door open alarm	E ₃	Probe T3 failure



= Click = Click and Hold

In case of alarm, press any key to mute the buzzer sound.

Info items	Navigation
<ul style="list-style-type: none"> t₁ Instant probe 1 temperature t₂* Instant probe 2 temperature t₃* Instant probe 3 temperature n_{in} Minutes of the RTC hr₅ Hours of the RTC Stt Start time for timed actions Edt End time for timed actions cnd** Compressor working weeks Loc Keypad state lock 	<ul style="list-style-type: none"> Display value Next Previous Exit <p>Real Time Clock (RTC) modification (MIN, HRS, STT, EDT)</p> <p>Increase / Decrease</p> <p>Keypad Lock / CND reset</p>

3. OPERATION

Setpoint I and II: display and modification	Standby (SB=YES)
<p>I Set: -30 → 1" → -10</p> <p>II Set: -08 → 3" → 08</p> <p>Increase / Decrease</p>	<p>Standby: -30 → 3" → OFF</p>

3.1 SELECTION OF SECOND PARAMETER GROUP

Manual (IISM=MAN)	Automatic (IISM=ECO)	Contact (IISM=DI)	Real time clock (IISM=RTC)
3"	ECO (See Fig. 3)	Dx=CLS / Dx=OPN	Group II: Start at STT End at EDT

3.2 DEFROST START

Manual	Real time clock (DFM=RTC)	Timed (DFM=TIM)	Optimized (DFM=FRO)
2"	Scheduled at DH1...DH6 time	DFT hours	T ₂ < 0°C for DFT hours
Remote start (DRS=RDS)		Synchronized (DRS=DSY)	

3.3 DEFROST TERMINATION

Time limit	Survey of 1 evaporator before time limit	Survey of 2 evaporators before time limit
DTO minutes	DTO minutes or T ₂ ≥ DLI	DTO minutes or T ₂ and T ₃ ≥ DLI

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. Then, after the FTO time has elapsed, the evaporator fans will re-start. Moreover, if T2=YES and it gets to the FDD temperature before FTO, then the fans re-start immediately. Caution: if DFM=NON all defrost functions are inhibited; if DFT=0, automatic defrost functions are excluded. During defrost, high temperature alarm is bypassed.

4. CONFIGURATION PARAMETERS

Access / Navigation / Modification
<p>Display value</p> <p>Increase or decrease value</p> <p>Next or previous parameter</p> <p>Exit</p>

PAR	RANGE	DESCRIPTION
SPL	-50...SPH	Minimum limit for SP setting.
SPH	SPL...110°	Maximum limit for SP setting.
SP	SPL... SPH	Setpoint (value to be maintained in the room).
CY0	1...10°	Thermostat cooling OFF → ON differential.
CY1	-10...0°	Thermostat cooling ON → OFF differential.
CRT	0...30min	Compressor minimum OFF time. The output is switched on at least after CRT minutes have elapsed since the previous switchover.
CMT	0...30min	Compressor minimum ON time.
CT1	0...30min	Compressor output run when probe T1 is faulty. With CT2=0 the output will always remain OFF.
CT2	0...30min	Compressor 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.
HED	-10...0°	Heating neutral zone
HEH	-10...0°	Heating differential.

DFM	NON; TIM; FRO; RTC	Defrost start mode NON : defrost function is disabled. TIM : regular time defrost. FRO : the defrost time count is only increased when the conditions occur for frost to form on the evaporator (optimised time increase). If the evaporator works around 0°C, defrost frequency depends on the climatic conditions. With setpoints much lower than 0°C, defrost frequency mainly depends on the compressor operating time. RTC : the defrost time is scheduled by parameters DH1, DH2, ...DH6.
DRS	NON; RDS; DSY	Defrost remote start. NON : defrost synchronization is disabled. RDS : when the input is on, a defrost is started (remote control). DSY : defrost synchronization. The controllers on the same bus will all start and end defrost together. The first controller in defrost induces defrost of all the others, then all the controllers end the drain down phase together (See paragraph 3.2).
DFT	0...99 hours	Time interval among defrosts. When this time has elapsed since the last defrost, a new defrost cycle is started. For example, with DFM =TIM and DFT =06, a defrost will take place every 6 hours.
DDS	0...99 hours	Minimum time between defrosts
DAR	NO/YES	Defrost time optimisation. If during temperature control the evaporator temperature is higher than DLI, this condition is considered as a defrost and thus the timer is re-started to count for the next defrost.
DSO	OFF; LO; HI	Defrost start - thermostat cycle synchronization OFF : none. The defrost will occur without delay. LO : defrost start will be postponed to compressor cut-out (SOD = max delay). HI : defrost start will be postponed to compressor cut-in (SOD = max delay).
SOD	0...30 min	Timer for defrost start - thermostat cycle synchronization. If 0, defrost will start immediately.
DH1 ... DH6	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". Example: DH1=8.30 AM. By pressing button for 3 seconds, you may get access to DH1-DH6 even out of the setup menu, keep hold the button for others 2 seconds to start a manual defrost.
DTY	OFF; ELE; GAS	Defrost type. OFF : off cycle defrost (Compressor and Defrost OFF). ELE : electric defrost (Compressor OFF and Defrost ON). GAS : hot gas defrost (Compressor and Defrost ON).
DPD	0...240sec	Delay for pressure equalization for hot gas defrost. At the beginning of defrost, compressor and defrost are OFF for DPD seconds.
DLI	-50...110°	Defrost end temperature.
DTO	1...120min	Maximum defrost duration.
DRN	0...30min	Compressor, defrost and fan outputs are OFF after defrost for the evaporator drain down.
DDM	RT; LT; SP; DEF	Defrost display mode. During defrost the display will show: RT : the actual temperature; LT : the last temperature before defrost; SP : the current setpoint value; DEF : "dEF".
DDY	0...60min	Display delay. The display shows the information selected with parameter DDM during defrost and for DDY minutes after defrost termination.
FID	NO/YES	Fans active during defrost.
FDD	-50...110°	Evaporator fan re-start temperature after defrost.
FTO	0...120min	Maximum evaporator fan stop after defrost.
FCM	NON; TMP; TIM	Fan mode during thermostatic control. NON : The fans remain ON all the time; TMP : Proportional control of the evaporator fans based on the temperature (OA5 = EFP). The evaporator fan speed is proportional to Te, to FET and FED (see Fig. 1). TIM : Timed based control. The fans are time controlled by parameters FT1, FT2, FT3. Both for the output on relay and the proportional output (OA5 = EFP). (See Fig. 2a, 2b).
FET	-50...110°	Target evaporator temperature (See Fig. 1)
FED	1...12°	Evaporator fan proportional band (See Fig. 1)
FSL	0...100%	Fan minimum speed (See Fig. 1)
FSH	0...100%	Fan maximum speed (See Fig. 1)
FT1	0...180sec	Times for fan control (See Fig. 2a, 2b).
FT2	0...30min	With FT2=0 the fans remain on all the time.
FT3	0...30min	With FT3=0 and FT2>0, the fans remain off all the time.
FMS	0...240sec	Fan Minimum Stop
ATM	NON; ABS; REL	Alarm threshold management. NON : temperature alarms are inhibited. ABS : it considers the absolute thresholds ALA and AHA only. REL : it considers the relative thresholds ALR and AHR only.
ALA	-50...110°	Low temperature alarm threshold.
AHA	-50...110°	High temperature alarm threshold.
ALR	-12...0°	Low temperature alarm differential. With ALR=0 the low temperature alarm is excluded.
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	Delay before alarm temperature warning.
ACC	0...52 weeks	Condenser periodic cleaning. When the compressor ON time, matches the ACC value programmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is disabled.
AHM	NON; ALR; STP;	Operation in case of high temperature condenser alarm NON : high condenser alarm inhibited. ALR : in case of alarm, "HC" flashes on the display and the buzzer is switched on. STP : in addition to the alarm symbols displayed, the compressor is stopped and defrosts are suspended.
AHT	-50...110°	Condenser unit temperature alarm (referred to T3 probe).
IISM	NON; MAN; ECO; DI; RTC	Switchover mode to second parameter set NON : inhibition to use the second parameter group. MAN : button switches the two parameter groups over. ECO : automatic switchover to the second parameter group, when ECO conditions are detected. DI : switchover to the second parameter group when Dix input is on. RTC : the second parameter group is activated at STT time and deactivated at EDT time.
IISL	-50...IISH	Minimum limit for IISP setting.
IISH	IISL...110°	Maximum limit for IISP setting.
IISP	IISL...IISH	Setpoint in mode 2.
IY0	1...10°	Thermostat OFF→ON differential in mode 2.
IY1	-10...0°	Thermostat ON→OFF differential in mode 2.
IIDF	0...99 hours	Time interval among defrosts in mode 2.
IIFT	-50...110°	Target evaporator temperature in mode 2
IIFD	1...12°	Evaporator fan proportional band in mode 2
ECS	1...5	Controller sensitivity for the automatic switchover from Group I to Group II (1=minimum, 5=maximum).
EPT	0...240 min	Eco pull-down time. Only with IISM=ECO. Group I parameters are used for control for at least EPT minutes. See Fig.3
SB	NO/YES	Stand-by button enabling.

DSM	NON; ALR; STP	Door switch input mode: NON : door switch inhibited ALR : when Dix=DOR and the digital input is on, an alarm is generated after DAD minutes STP : when Dix=DOR and the digital input is on, the fan are immediately stopped, the compressor will be stopped after CSD minutes and the warning indication will be generated after DAD minutes.
DAD	0...30 min	Delay before door open alarm warning.
CSD	0...30 min NO	Compressor stop delay after door has been opened. If CSD=NO compressor never stops due to the door opening.
DOT	0...200 min	Door stop timeout. If the door switch remains open for longer than DOT minutes, it will then be ignored. With DOT=0, this function is disabled.
D10	NON; DOR; ALR; IISM	D11 digital input operation NON : digital input not active. DOR : door input. ALR : when the input is on, an alarm is generated (if AHM=STP, the compressor is stopped and the defrosts are suspended). IISM : when the input is on, the controller will use group II parameters.
D1A	OPN; CLS.	D11 digital input activation. OPN : on open CLS : on close
D20	See D10	D12 digital input operation. See D10.
D2A	OPN; CLS.	D12 digital input activation. See D1A.
D30	See D10	D13 digital input operation. See D10.
D3A	OPN; CLS.	D13 digital input activation. See D1A.
LSM	NON; MAN; DOR; RTC.	Light control mode NON : light output not present. MAN : light output controlled through button DOR : lights ON/OFF following the door state (Dix=DOR). RTC : lights change state at STT time, then they revert their state at EDT time.
LSA	OPN; CLS	Light activation (only with LSM=DOR or RTC). OPN : lights on with Dix opened, or at EDT time. CLS : lights on with Dix closed, or at STT time.
STT	HH.M	Start time for timed action.
EDT	HH.M	End time for timed actions.
OA1	NON; LGT; 0-1; CMP; HTR; DEF; FAN; ALO; ALC.	OUT1 output operation NON : output disabled (always off). LGT : output enabled for light control. 0-1 : the relay contacts follow the on/standby state of controller. CMP : compressor. HTR : heater, see parameters HED, HEH. DEF : defrost. FAN : evaporator fan. ALO : contacts open when an alarm condition occurs. ALC : contacts make when an alarm condition occurs.
OA2	See OA1	OUT2 output operation. See OA1.
OA3	See OA1	OUT3 output operation. See OA1.
OA4	See OA1	OUT4 output operation. See OA1.
OA5	NON; LGT; 0-1; CMP; HTR; DEF; ALO; ALC; EFP.	OUT5 output operation. NON ... ALC : see OA1. EFP : evaporator fan proportional control.
OS1	-12...12°	Probe T1 offset.
T2	NO/YES	Probe T2 enabling (evaporator).
OS2	-12...12°	Probe T2 offset.
T3	NON; AU; CND; 2EU	Auxiliary probe T3 operation NON : probe T3 not fitted. AU : auxiliary probe. CND : condenser temperature measurement. 2EU : second evaporator temperature measurement.
OS3	-12...12°	Probe 3 offset.
TDS	T1; 1-2; T3	Selects the temperature probe to be displayed. T1 : probe T1 1-2 : the AVG-weighted average between T1 and T2 T3 : probe T3
AVG	0...100%	The relative weight of T2 on T1 (if TDS = 1-2) Example 1: T1 = -5°, T2 = -20°, AVG = 100%. The displayed temperature will be -20° (T1 has no effect) Example 2: T1 = -5°, T2 = -20°, AVG = 60%. The displayed temperature will be -14.
SCL	1°C; 2°C; °F	Readout scale. 1°C : measuring range -50...110°C (0.1°C resolution within -9.9 + 9.9°C interval, 1°C outside) 2°C : measuring range -50 ... 110°C °F : measuring range -55 ... 180°F
SIM	0...100	Display slowdown.
ADR	1...255	BR5-A address for PC communication.
PRT	ASC; RTU	ASCII and RTU Modbus protocol selection.
RFS	NO/YES	Reset factory settings.

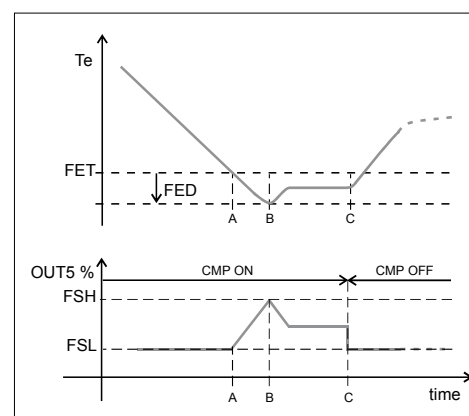


Fig. 1: Evaporator fan on OA5 = EFP when FCM = TMP

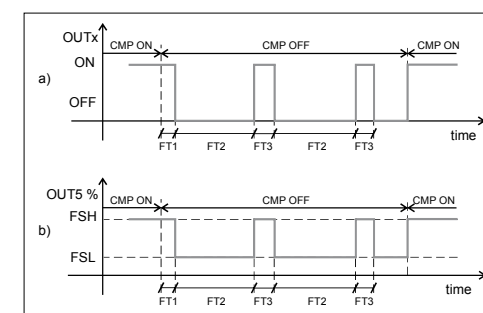


Fig. 2: a) Evaporator fan on relay when FCM = TIM
b) Evaporator fan on OA5 = EFP when FCM = TIM

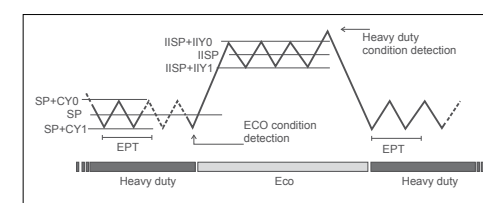
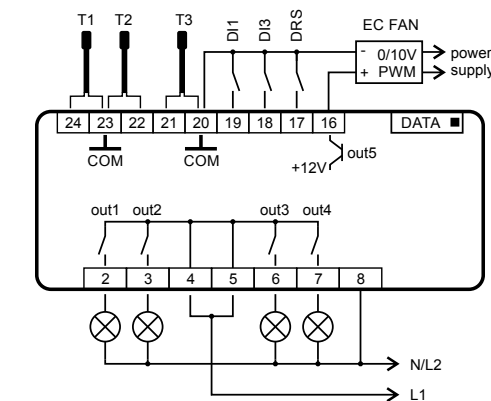


Fig. 3: EPT parameter

5. WIRING DIAGRAM



6. TECHNICAL DATA

Power supply
BR1-5 100-240Vac ±10%, 50/60Hz, 3W

Relay output max loads (240Vac)

Output	Model	BR1-5
OUT1		12A resistive 3.5 FLA;21 LRA
OUT2		7A resistive 1 FLA;4 LRA
OUT3		7A resistive 1 FLA;4 LRA
OUT4		7A resistive 1 FLA;4 LRA
OUT5		SELV 90mA@12Vdc

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

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

Measurement accuracy
<0.5°C on the whole measurement range

Real Time Clock battery
Lithium battery (>10 years)

Operating conditions
-10 ... +50°C; 15%...80% r.H.
Pollution degree 2

Approvals and Reference Norms
- RoHS 2011/65/UE
- EN50082-1; EN55022 (Class B);
- EN60730-1; EN60730-2-9;
- UL60730-1.



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