LF28

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

1.1 LF28, size 105x90x55 mm (WxHxD), must be fitted to a DIN rail in such a position so as to prevent debris and moisture infiltration which may cause serious damage and compromise safety.
1.2 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 flat connecting cable, the sensor and signal cables well separate from the power wires.
1.3 The display unit LCD16 is secured to the panel by means of the two springs on the side of the box. The unit is mounted on the panel through a 29x71 mm opening, exert a moderate pressure so as to get the LCD16 to align flush to the panel surface. The main unit LF28 and the display unit LCD16 are connected to each other by means of the flat cable supplied in the package.
1.4 The sensor T1 measures the air temperature and activates in the thermostat control cycle; it should be placed inside the appliance in a point that truly represents the temperature of the stored product. If enabled (T2=YES), the sensor T2 measures the evaporator temperature and should be placed where there is the maximum formation of frost. If enabled (T3=YES), the sensor T3 should be located between the condenser fins, half way between the condenser inlet and outlet. The auxiliary sensor T4 can be used to monitor the temperature of either a second evaporator (T4=2EU), or of a second condensing unit (T4=2CU) or disabled (T4=NON).
CAUTION*: should the relays have to switch a heavy load frequently, it is advisable to contact the manufacturer for indications on the lifetime of the contacts.*
Whenever products must be kept within very severe specifications or the products have considerable value, the use of a second instrument is recommended, which activates upon or warns of any malfunction.

2. OPERATING MODES

Upon switching on, just the central line (autotest) appears on the display for approximately three seconds and the subsequent indications depend on the operating status of the controller. TABLE 1 gives the indications associated with the various states, whereas the symbols appearing in the text are explained in TABLE 2.

STANDBY	NORMAL	INFO MENU	INFO DATA	SETUP MENU	PARAMETER VALUE
OFF Not Operating	-19 Product Temper. (sim.)	T1 Air temperature	-20	SCL Display scale	1°C
	DEF Defrost	T2 Evaporator temperature	-25	SPL Minimum setpoint	-25
	REC Recovery after defrost	- - - ...	- - -	SPH Maximum setpoint	-18
	HI High temp. alarm	TLO Min. stored temperature	-19	- - -	- - -
	- - -	CND Condenser clean cycle	15	- - -	- - -
	E1 Faulty T1 probe	LOC Locked keypad	NO	- - -	- - -

TABLE 1

2.1 **STANDBY.** If button ⏻ is pressed for 3 seconds, it allows the LF28 to be put on a standby, or to resume output control (with

parameter **SB**=YES only). An OFF indication on the display shows that the outputs are off permanently.

2.2 NORMAL. During normal operation, the display shows the temperature measured by probe T1, presented in the most appropriate manner. Parameter **SCL** may be adjusted in °C with auto-range (**SCL**=1°C), in °C with 1° fixed resolution (**SCL**=2°C) or in Fahrenheit (**SCL**=°F). The measured temperature may be corrected with a fixed offset by assigning a value other than 0 to the parameter **OS1**, the same procedure applies to probes T2, T3, T4, which may be corrected by the respective offsets OS2, OS3, OS4. Additionally, prior to display, the temperature is treated by an algorithm that allows the simulation of a thermal mass directly proportional to the **SIM** value. The result is a reduction in the fluctuation of the displayed value.

2.3 INFO MENU. Pressing the button i·set and releasing it immediately activates the information selection menu. From this menu you can display the instantaneous temperatures T1, T2, T3 and T4; the maximum (THI) and minimum (TLO) stored temperature; the total operating time of the condenser since its last cleaning (CND) and the keypad status (LOC). The information to be displayed can be selected sequencially, by pressing i·set repeatedly or quickly via the buttons ◄ and ► to scroll through the menu. Exit from the info menu is by pressing button 0/I or automatic after 6 seconds of not using the keypad.

In the INFO operating mode it's also possibile to reset the recordings THI and TLO and the hour counter CND by pressing buttons i·set +0/I simultaneously while the value is displayed.

2.4 SETPOINT. The setpoint value is displayed by keeping the button i·set pressed for at least half second. The programming range is within the limits **SPL** and **SPH**. When the button is released, the newly programmed value will be stored immediately. The effective setpoint values, minimum and maximum limits, will depend on the mode selected I/II active at the time of the selection.

2.5 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 mode, through the buttons ◄ and ► it's possibile to assign YES or NO to the parameter **LOC**. With LOC=YES all keypad commands are inhibited. To resume normal operation of keypad, adjust setting so that LOC=NO.

2.6 DEFROST. By assigning a value greater than 0 to the parameter **DDY**, during defrost the indication DEF is displayed instead of the temperature. In this case, after defrost and for the time programmed in DDY, the display indication REC shows that the normal thermostatic cycle is being resumed.

2.7 ALARM. An anomaly in the operation is displayed through the lighting up of an abbreviation showing its cause: HI/LO high/low alarm temperature in the cabinet, DO door open, HP condenser high pressure, HC condenser high temperature, CL periodic condenser cleaning, E1/E2/E3/E4, fault of probe T1 / T2 / T3 / T4.

2.8 SETUP. The setup is accessed by pressing the buttons 0/I+i·set in succession and keeping them pressed simultaneously for 5 seconds. The available parameters appear in TABLE 2 as shown below.

3. CONFIGURATION

The controller is configured for the system to be controlled by programming the operating parameters, that is, through the setup (see par. 2.8). In SETUP, press button ► to pass from one parameter to the next, and press button ◄ to go back. To display the value of a parameter press i·set, to modify it press buttons i·set + ◄ or ► simultaneously. Exit from the setup is by pressing button 0/I or automatic after 30 seconds of not using the keypad.

Par.	Adjustment	Function	Sect
SCL	1°C/2°C/°F	Readout scale	2.2
SPL	-40.. SPH [°]	Minimum temperature set point	2.4
SPH	SPL.. +40 [°]	Maximum temperature set point	2.4
SP	SPL.. SPH [°]	Effective set point	4.1
HYS	+0.1.. +10.0 [°]	Thermostat hysteresis	4.1
CRT	0.. 30 [min]	Compressor rest time	4.1
CT1	0.. 30 [min]	Compressor run with sensor T1 failure	4.2
CT2	0.. 30 [min]	Compressor stop with T1 failure	4.2
1)2CD	0.. 120 [sec]	Start delay 2nd compressor	9.3
DFR	0.. 24	Defrost frequency /24h	5.1
DLI	-40.. +40 [°]	Defrost end temperature	5.3
DTO	1.. 120 [min]	Maximum defrost duration	5.3
DTY	OFF/ELE/GAS	Defrost type	5.2
DRN	0.. 30 [min]	Drain down time	5.4
DDY	0.. 60 [min]	Defrost display control	2.6
FID	YES/NO	Fans active during defrost	6.3
FDD	-40.. +40 [°]	Fan re-start delay temperature	6.4
FTO	0.. 120 [min]	Evaporator fan maximum time-out	6.4
FTC	YES/NO	Evaporator fan timed control	6.1
FT1	0.. 180 [sec]	Fan stop delay	6.1

Par.	Adjustment	Function	Sect
ACC	0.. 52 [weeks]	Periodic condenser cleaning	7.5
HDS	1.. 5	Sensitivity function eco / heavy duty	9.2
IISM	NON/MAN/HDD/DI2	2nd set switching mode	9.1
1)IISL	-40.. IISH [°]	Minimum 2nd temperature set	2.4
1)IISH	IISL.. +40 [°]	Maximum 2nd temperature set	2.4
1)IISP	IISL.. IISH [°]	Effective 2nd temperature set	4.1
1)IIHY	+0.1.. +10.0 [°]	Hysteresis of 2nd temperature set	4.1
1)IIFT	YES/NO	Evaporator fan timed control in mode 2	6.1
1)IIDF	0.. 24	Defrost frequency /24h In mode 2	5.1
SB	YES/NO	Button 0/I enabling	2.1
DS	YES/NO	Door switch enabling	6.2
2)CSD	0.. 30 [min]	Compressor stop delay from door opening	4.3
2)ADO	0.. 30 [min]	Door alarm delay	7.2
DI2	NON/HPS/IISM/RDS	Function digital input DI2	9.5
LSM	NON/MAN/DOR	Light switch mode	9.3
OAU	NON/0-1/LGT/2CU/2EU/ALR	Control of AUX output	9.4
OS1	-12.. +12 [°]	probe T1 offset	2.2
T2	YES/NO	Probe T2 enabling	1.4
OS2	-12.. +12 [°]	Probe T2 offset	2.2
T3	YES/NO	Probe T3 enabling	1.4

Par.	Adjustment	Function	Sect
FT2	0.. 30 [min]	Timed fan stop	6.1
FT3	0.. 30 [min]	Timed fan run	6.1
ATL	-12.. 0 [°]	Low alarm differential	7.1
ATH	0.. +12 [°]	High alarm differential	7.1
ATD	0.. 120 [min]	Effective set point	7.1
AHT	0.. 75 [°]	Thermostat hysteresis	7.3
AHM	NON/ALR/STP	Condenser high temperature alarm operation	7.3

Par.	Adjustment	Function	Sect
OS3	-12.. +12 [°]	Probe T3 offset	2.2
T4	NON/2CU/2EU	Function auxiliary probe T4	1.4
OS4	-12.. +12 [°]	Probe T4 offset	2.2
TLD	1.. 30 [min]	Delay for min./max. temperature storage	8
SIM	0.. 100	Display slowdown	2.2
ADR	1.. 255	Peripheral address	9.6

TABLE 2

1) Only with OAU=2CU; 2) Only with IISM different from NON; 3) Only with DS=YES.

***CAUTION**: upon changing the display scale SCL, it is **ESSENTIAL** to reconfigure the parameters related to the absolute (SPL, SPH, SP, etc.) and differential (HYS, ATL, ATH, etc.) temperatures.*

4. THERMOSTAT CONTROL

4.1 Thermostat control is based on comparing the temperature T1, the set point ***SP** and the hysteresis ***HYS**.
Example: SP= 2.0; HYS= 1.5, compressor Off with T1= +2.0° and On with T1= +3.5° (2+1.5).
The compressor only switches On again if the Off time period determined by **CRT** since the previous switchover has elapsed. Whenever a very small hysteresis HYS must be maintained, it is advised that a suitable value for CRT is selected in order to reduce the number of starts per hour.
4.2 If sensor T1 fails, the compressor is controlled on a fixed time, through the parameters **CT1** and **CT2**: CT1 determines the run time and CT2 the rest time.
Example: with CT1=03 and CT2=06 the compressor will cycle 3 minutes On and 6 minutes Off.
Setting CT1=0 causes the compressor to be OFF all the time and, viceversa, with CT1 different from 0, and CT2=0 the compressor will always be ON.
4.3 If door switch input control has been enabled (DS=YES), parameter **CSD** determines the delay between when the door is opened and the compressor stopping.
* Actual setpoint and hysteresis depend on the selection **I/II**: in mode **I**, the reference parameters are **SP** and **HYS** while in mode **II**, **IISP** and **IIHY**.

5. DEFROSTING

5.1 Defrosting starts automatically when necessary time has elapsed to obtain the defrosting frequency set with ***DFR**. For example, with DFR=4 there will be 4 defrostings per 24 hours, so defrosting occurs once every 6 hours. With DFR=0 the timed defrosting function is removed.
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).
Defrosting may also be induced manually by pressing the button DEF for 2 seconds or, with **DI2**=RDS, through the activation of an external contact (remote defrost start).
During a High Pressure alarm (see par. 7.3 e 7.4) defrost is suspended.
5.2 Once defrost has started, the outputs are controlled according to parameter **DTY** as per the following table:

DTY	DEFROST	COMPRESSOR
OFF	Off	Off
ELE	On	Off
GAS	On	On

Table 3

5.3 The actual defrost duration and output activation is determined by a series of parameters.
5.3a. Time termination: T2=NO and T4 different from 2EU. In this case the evaporator temperature is not monitored and defrost will always last as long as time **DTO**.
5.3b. Temperature monitoring of one evaporator: T2=YES and T4 different from 2EU. In this case, if the sensor T2 measures the temperature **DLI** before the time DTO elapses, defrost will be terminated in advance.
5.3c. Temperature monitoring of two evaporators: T2=YES, T4=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

evaporator to get to that temperature before the time DTO elapses.
5.4 After defrost, if parameter **DRN** is greater than 0, before cooling starts all outputs will remain off for the time assigned to DRN. This phase, called drain down, will allow a complete ice melting and the drain of the resulting water.
* The actual defrost frequency depends on the selection **I/II**: in mode **I**, the reference parameter is **DFR** while in mode **II** it's **IIDF**.

6. EVAPORATOR FANS

6.1 During thermostatic control, the evaporator fans are controlled by parameter ***FTC**, **FT1**, **FT2** and **FT3**.
With FTC=YES you enable an optimised fan control; the fans will operate in conjunction with the compressor and after the compressor has stopped, the fans will be activated according to the time FT1 (recovery of accumulated cooling), after that they will be stopped for the time FT2 (energy saving). When FT2 has elapsed, the fans will run for the time FT3 (whirling air stratifications).
Example: FT1=30, FT2=4, FT3=1. With those values the fans will cut-in together with the compressor and will stop 30 seconds after the compressor has stopped; now, a 4 minute OFF and 1 minute ON cycle will take place till the compressor starts again.
With FT2=0 the fans will always be active. Viceversa, if FT2 is different from 0 and FT3=0, the fans will always be off.
With FTC=NO the optimised control is excluded, so the fans will run all the time.
6.2 If the LF28 is connected to a door switch and door switch control is enabled (**DS**=YES), during thermostatic control if the door is opened, the fans will be stopped immediately.
6.3 During defrost, the fans are controlled by parameter **FID**; with FID=YES the fans remain on all through defrosting. With FID=NO, the fans will be stopped and will only re-start when the conditions in paragraph 6.4 have been met.
6.4 After defrosting, if probe T2 is active (T2=YES), temperature **FDD** provides evaporator fan re-start. So the evaporator fans will not run until the evaporator has a temperature lower than FDD. Viceversa, if either probe T2 is not active (T2=NO) or, after defrost termination, such condition doesn't occur within the time **FTO**, the fans will however be switched on again.
* The way the fans will be controlled depends on the selection **I/II**: in mode **I** they work according to **FTC**, while in mode **II** the fans work according to **IIFT**.

7. ALARMS

With LF28, correct operation of the refrigerator and thermostat may be monitored by a wide range of functional and diagnostics alarms, individually selectable by means of the relevant parameters. The alarm warnings are given on the display through explicit indications (see following par.), the auxiliary relay contacts open (if present in model and if OAU=ALR) and intermittent buzzer sounding. During an alarm, by pressing any button, the buzzer is muted. Then, if the alarm persists, the buzzer will be periodically switched on for 20 seconds every 60 minutes, until the alarm ends (the display indications remain on all the time). The repeated acoustic warning applies to all alarms with the exception of the condenser cleaning alarm. Operation of the various elements is given in detail below.
7.1 **ATL** establishes the alarm differential for temperatures below set point, **ATH** the alarm differential for temperatures above set point + hysteresis. Putting one or both differentials to 0 cuts out the corresponding alarm.
Example: SP= -20, HYS= 2.0, ATL= -5.0, ATH= 5.0; the alarm thresholds are set at –25°(-20-5) and –13° (-20+2+5).
The alarm warning may be immediate or delayed by the time **ATD** whenever this is greater than 0. The indication HI for high temperature and LO for low temperature alarm blinks on the display. The alarm indication remains stored in the display, even when the alarm is over, until you acknowledge the alarm manually by pressing any button.
The high temperature alarm is bypassed during defrosting.
7.2 If a suitable door switch has been connected to detect the door status and door switch input control has been enabled (DS=YES), the door open alarm function is enabled. In this way, if the door remains open the controller will react after the time delay set with ADO by displaying the alarm source through the indication DO.
7.3 To monitor the condensing unit temperature to avoid gas pressure from getting too high, it's necessary to secure the probe T3 to the condenser firmly (see 1.4) and enable condenser probe control (T3=YES). If there is a second condensing unit in the plant and this should be monitored (OAU=2CU), it's necessary to secure the sensor T4 in the same way as the sensor T3 and to enable it with T4=2CU.
Parameter **AHT** determines the condenser temperature alarm threshold for one or both probes and parameter **AHM** determines the reaction following the temperature rising over AHT. With AHM=ALR the only reaction will be the buzzer sounding, HC being displayed and the alarm relay switched on. Alternatively, with AHM=STP, besides the alarm indication the compressor will be stopped immediately and defrosts suspended.
With AHM=NON, all functions related to the High Temperature and High Pressure alarm (par. 7.4) are inhibited.
7.4 The correct operation of the condensing unit may not only be monitored via temperature (par. 7.3), but also through a safety pressure switch. In this case, the digital input DI2 is to be used by programming DI2=HPS; in this way, when the pressure switch opens, a high pressure alarm will be displayed HP combined with the alarm function programmed with AHM (ALR or STP).
7.5 Assigning a value greater than 0 to the parameter **ACC** enables the indication for periodic cleaning of the condenser. Subsequently, when the count of compressor hours of operation reaches the equivalent in weeks set with ACC, an indication for cleaning appears on the display.
Example: with ACC=16 there is a warning once every 16x7(weeks)x24(hours)=2688 hours of compressor operation, so, assuming for this an operation

with 5 minutes On and 5 minutes Off - after approx. 32 weeks.
In order to clear the time counter, follow the prescribed procedure in paragraph 2.3.
7.6 Upon failure of probe T1 or, if enabled, probes T2, T3 or T4, probe failure is signalled with the blinking indication E1 or E2 or E3 or E4 respectively.

8. TEMPERATURE STORAGE

The LF28 features a system for permanent storage of the minimum and maximum temperature logged during operation. This system is a valid help to achieve compliance with the HACCP directive in its part relating to a correct preservation of foodstuffs. Temperature is measured by probe T1 which should therefore be placed in a point where the temperature of the preserved product may always be measured correctly. The logging is however subject to some simple rules that filter the data and give a rational interpretation. The logging is suspended during the periods in which the refrigerator is put on a standby and during defrostings and, during the normal operation (thermostatic control), it's "slowed down" through the parameter **TLD**. This parameter defines the time during which the measured temperature must permanently exceed the current value before the logging is performed. In this way, it will be possible to avoid idle loggings that don't reflect the actual product temperature, for example, the door being left open, the temperature recovery after a defrost or other temporary short term temperature huntings.
It is suggested that a reasonably long TLD time is programmed, for instance 5-15 minutes, you then put the product into the refrigerator and start a new logging cycle by clearing previous values (see par. 2.3). It will now suffice that at regular intervals, in the INFO menu you check the minimum and maximum logged values in order to know if the product has been kept within the required temperature limits.

9. AUXILIARY FUNCTIONS

9.1 In addition to the basic functions described above, the LF28 offers an innovative feature to enhance the performance of the refrigerator. Infact, you can select the control parameters between two different pre-programmed groups, in order for the fundamental control parameters to be adapted quickly to changing needs such as, for example: High/Low Temperature range change, stored product change (meat, fish, vegetables …), maximum cooling capacity or energy saving. The parameters switched over in mode **I** and **II** are: **SPL**, **SPH**, **SP**, **HYS**, **DFR**, **FTC** and **IISL**, **IISH**, **IISP**, **IIHY**, **IIFT**, **IIDF**.
With the parameter **IISM** you select if the changeover from Group I to Group II is made manually, via the button I/II (IISM=MAN), or automatically when heavy duty operation is detected (IISM=HDD), or when the auxiliary input is activated (IISM=DI2), or inhibited (IISM=NON). The activation of Group II is signalled by the lighting up of the relevant LED on the controller display.
9.2 The automatic detection of "heavy duty operation" allows the control parameters to be modified in response to the specific temporary needs of the refrigerator, such as: warm food being put into the cabinet, door being opened frequently etc. Control sensitivity to switch over from Group I to Group II is determined by parameter **HDS** (1=minimum, 5=maximum). An example of how to use such function is reported in the following table:

PARAMETER	GROUP I	GROUP II
setpoint	SP=-18	IISP=-21
Hysteresis	HYS= 2.0	IIHY= 3.0
Defrost frequency	DFR= 3	IIDF= 1.. 0
intermitt. fans	FTC= YES	IIFT= NO

If we apply the above example to a refrigerator in a restaurant kitchen the controller will use the parameters of Group I during the closing times of the kitchen, when the need for cooling is minimum, therefore we can consider this as a "normal" operation condition. Group I "economy control" parameters will ensure both an optimum foodstuff preservation and considerable energy saving. Alternatively, during very busy periods (door being opened continuously to take out or load food), the controller will automatically select Group II to try and maintain the average product temperature within correct values (lower setpoint), limit compressor wear by reducing the number of starts (higher hysteresis), avoid long defrost pauses which will worsen the preservation condition (lower defrost frequency or no defrosts at all), increase product cooling speed by keeping ventilation always active (IIFT=NO). When the heavy duty period is over, the controller will automatically resort back to Group I.
NOTE: To make the automatic detection IISM=HDD work better, it is suggested that the value of hysteresis is not set too narrow (less than 2°K) or the value of CRT is not set too high (longer than 2 minutes).
9.3 if fitted, the auxiliary output can be programmed for the control of the refrigerator lights. Through the parameter **LSM** you select how the lights are turned on: manually, through the button ▶ (LSM=MAN), or when the door is opened (LSM=DOR). With LSM=NON, this function is disabled.
9.4 The operation of the auxiliary output, if fitted depending on the model, is controlled through the parameter **OAU**. With OAU=0-1 the relay contacts follow the on/off status of controller (standby=OFF); with OAU=LGT, the output is used to control the refrigerator lights (see 9.3). With OAU=2CU the output is programmed to drive the second condensing unit, i.e. an auxiliary compressor which is piloted

in parallel with the main compressor, and its start is delayed by an amount of seconds programmed with the parameter 2CD; viceversa, the second compressor stops together with the main compressor. With OAU=2EU the output is enabled for the control of the electrical defrost of the second evaporator (see par. 5.3) and finally, with OAU=ALR the output is connected to the alarm function, the contacts are therefore closed during normal operation and open when an alarm condition occurs (reversed operation). With OAU=NON the contacts remain open constantly.

Main combinations

Manual control of lights: LSM=MAN, OAU=LGT.
Two compressors with temperature protection: OAU=2CU, 2CD=10 seconds, T3=YES, T4=2CU, AHM=STP.
Two compressors with pressure protection: OAU=2CU, 2CD=10 seconds, T3=NO, T4=NON, DI2=HPS, AHM=STP.
Two evaporators: OAU=2EU, T4=2EU, DTY=ELE.

9.5 The function performed by the second digital input **DI2** is chosen among: HPS, safety pressure switch (see 7.4); IISM, parameter group selection (see 9.2); RDS, start of defrost from a remote contact (see 5.1 and following).
If the DI2 inputs of two or more controllers must be linked to each other to establish a remote defrost start control, it's mandatory to use the optocoupled version (mod. LF28x3xx).

9.6 The controller is provided with a serial port for connection to a PC or a 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.

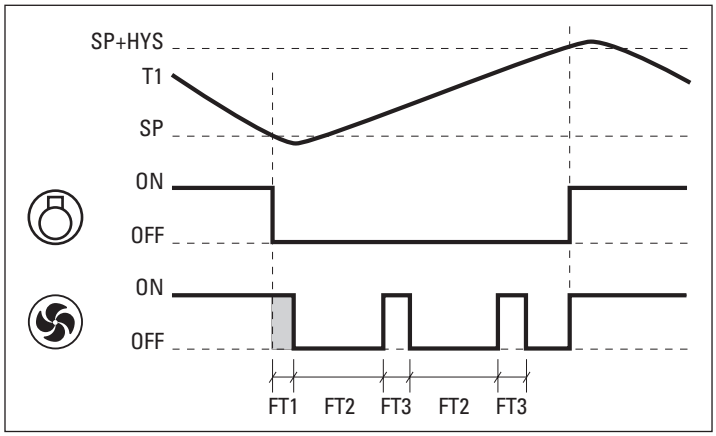


Figure 1 Thermostat and fan operation

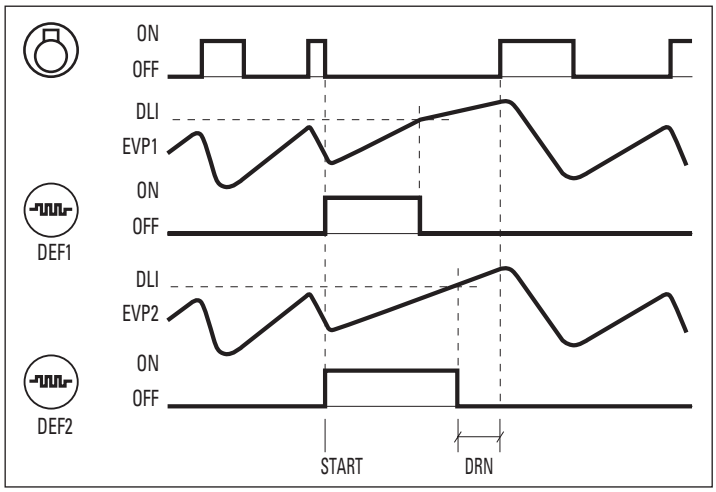
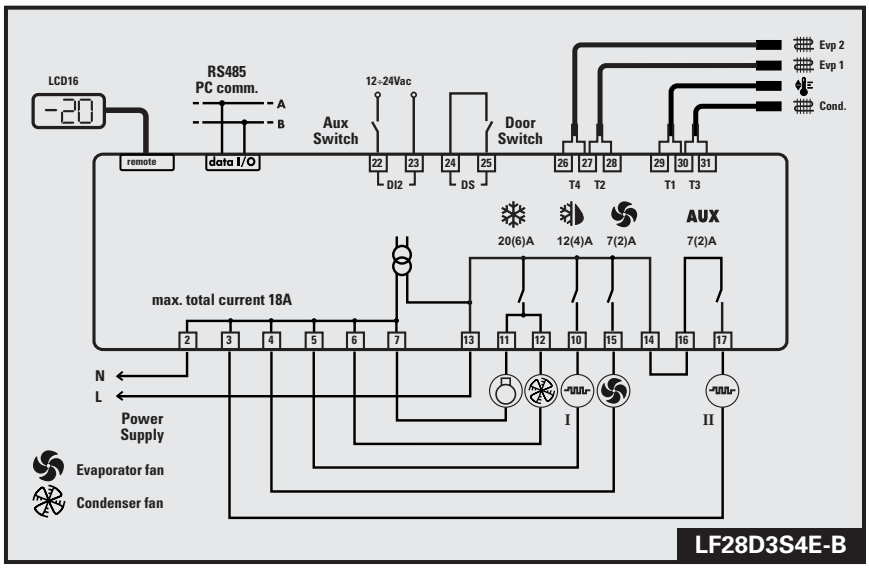


Figure 2 Defrost operation

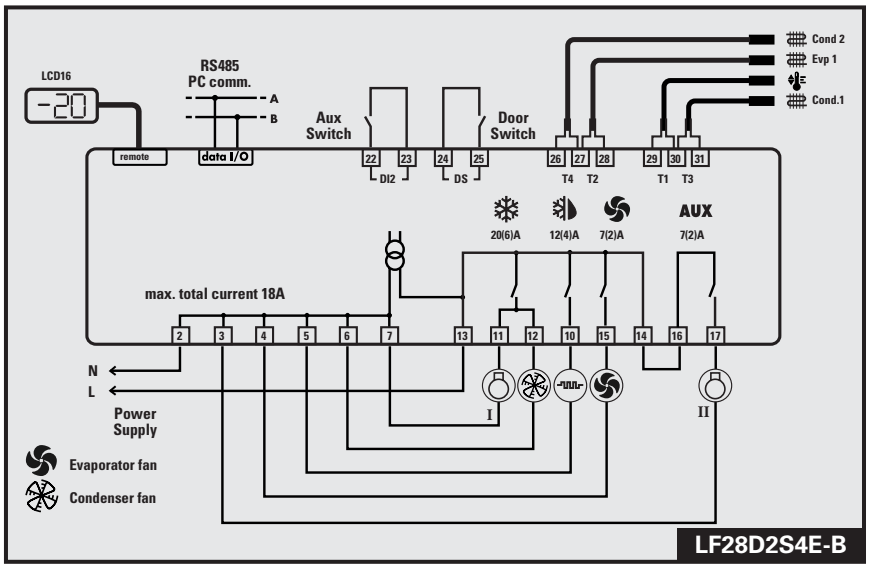
WARRANTY

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.

WIRING DIAGRAM



LF28D3S4E-B



LF28D2S4E-B

PARTNER VENEZIA • 041 5460713

VIA PADOVA, 25
31046 ODERZO /TV /ITALY
TEL. 0422 815320 - 815303
TELEFAX 0422 814073
www.lae-electronic.com
E-mail: info@lae-electronic.com