

BR1-27 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

- The BR1-27 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.
- 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. With T3=DSP the probe measures the temperature to be displayed. With T3=CND the probe measures the condenser temperature, it must therefore be placed between the fins of the condensing unit. With T3=2EU the probe measures the temperature of the second evaporator and it must therefore be placed where there is the maximum formation of frost. With T3=NON, the third probe is disabled.
- At the first power-up or after a long power failure, the display might show "TIM": press any of the buttons to mute the buzzer, then check if the real time clock is correct (MIN, HRS).

2. DISPLAY INFO

	Alarm		Room high temperature alarm
	Thermostat output		Room low temperature alarm
	Fan output		Condenser high temperature
	Defrost output		Generic alarm
	Activation of 2nd set		Condenser clean warning
	Controller in stand-by		Probe T1 failure
	Defrost in progress		Probe T2 failure
	Door open alarm		Probe T3 failure
	Check clock time		

= Click = Click and Hold

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

Info items	Navigation
Instant probe 1 temperature	Display value
Instant probe 2 temperature	Next
Instant probe 3 temperature	Previous
Minutes of the RTC	Exit
Hours of the RTC	
Start time for timed actions	Real Time Clock (RTC) modification (MIN, HRS, STT, EDT)
End time for timed actions	Increase
Max probe 1 temperature	Decrease
Min probe 1 temperature	
Compressor working weeks	Keypad Lock
Keypad state lock	THI / TLO / CND reset

**: only if enabled **: only if ACC > 0*

3. OPERATION

Setpoint I and II: display and modification	Standby (SB=YES)

3.1 SELECTION OF SECOND PARAMETER GROUP

Manual (IISM=MAN)	Automatic (IISM=ECO)	Contact (IISM=D1)	Real time clock (IISM=RTC)

3.2 DEFOST START

Manual	Real time clock (DFM=RTC)	Timed (DFM=TIM)	Optimized (DFM=FRO)	Remote (DxO=RDS)

Synchronized (D2O=DSY)

Start and end are synchronized among connected BR1-27

3.3 DEFOST TERMINATION

Time limit	Survey of 1 evaporator before time limit	Survey of 2 evaporators before time limit

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.

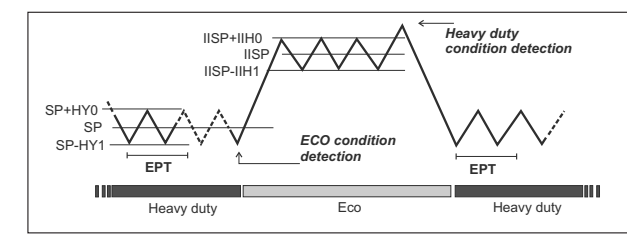
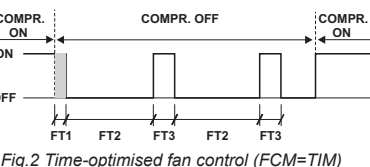
Caution: if DFM=NON or C-H=HEA all defrost functions are inhibited; if DFT=0, automatic defrost functions are excluded. During defrost, high temperature alarm is bypassed.

4. CONFIGURATION PARAMETERS

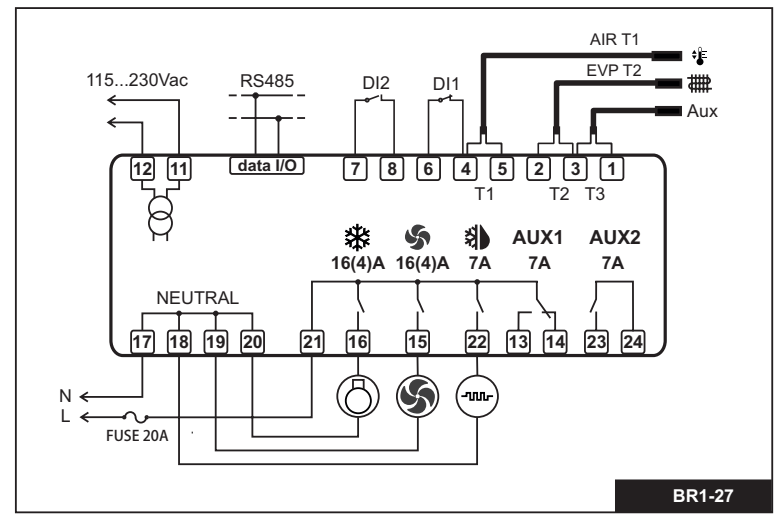
PAR	RANGE	DESCRIPTION
SPL	-50...SPH	Minimum limit for SP setting.
SPH	SPL...110°	Maximum limit for SP setting.
SP	SPL...SPH	Setpoint (value to be maintained in the room).
C-H	REF; HEA	Refrigerating (REF) or Heating (HEA) control mode.
HY0	1...10°	Thermostat OFF -> ON differential.
HY1	0...10°	Thermostat ON -> OFF differential.
CRT	0...30min	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 HY0<2.0°.

CT1	0...30min	Compressor/Heater output run when probe T1 is faulty. With CT1=0 the output will always remain OFF.
CT2	0...30min	Compressor/Heater 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.
DFM	NON; TIM; FRO; RTC	Defrost start mode NON : defrost function is disabled (the following parameter will be FCM). 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 at 0°C, defrost frequency depends on the thermal load and climatic conditions. With setpoints much lower than 0°C, defrost frequency mainly depends on the refrigerator operating time. RTC : the defrost time is scheduled by parameters DH1, DH2, ...DH6.
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.
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 re-start to count from zero.
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=8.3 means 8.30 AM.
DLI	-50...110°	Defrost end temperature.
DTO	1...120min	Maximum defrost duration.
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).
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	Timeout for defrost start - thermostat cycle synchronization. If 0, defrost will start immediately.
DPD	0...240sec	Evaporator pump down. At the beginning of defrost, defrost outputs (determined by DTY) are OFF for DPD seconds.
DRN	0...30min	Pause after defrost (evaporator drain down time).
DDM	RT; LT; SP; DEF	Defrost display mode. During defrost the display will show: RT: the real 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 : 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 fans are turned ON again with FDH differential. (Te = Evaporator temperature, Ta = Air temperature). TIM : Timed-based control. The fans are ON when the compressor is ON. When the compressor is OFF, the fans switch ON and OFF according to parameters FT1, FT2, FT3 (See Fig.2).
FDT	-12...0°	Evaporator-Air temperature difference for the fans to turn OFF after the compressor has stopped.
FDH	1...12°	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 > Ta - 1 (FDT), whereas the fans are ON when Te < Ta - 4 (FDT-FDH).
FT1	0...180sec	Fan stop delay after compressor/heater stop.
FT2	0...30min	Timed fan stop. With FT2=0 the fans remain on all the time.
FT3	0...30min	Timed fan run. With FT3=0, and FT2 > 0, the fans remain off all the time.
ATM	NON; ABS; REL	Alarm threshold management. NON : all temperature alarms are inhibited (the following parameter will be ACC). 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.
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 operation time, expressed in weeks, matches the ACC value programmed, "CL" flashes in the display. With ACC=0 the condenser cleaning warning is disabled and CND disappears from Info Menu.
IISM	NON; MAN; ECO; DI; RTC	Switchover mode to second parameter set NON : inhibition to use the second parameter group (the following parameter will be SB). 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.
IIH0	1... 10°	Thermostat OFF->ON differential in mode 2.
IIH1	0... 10°	Thermostat ON->OFF differential in mode 2.
IIDF	0...99 hours	Time interval among defrosts in mode 2.
IIFC	NON;TMP;TIM	Fan control in mode 2. See FCM.
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 in regulation 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, in addition to the alarm, the fans are immediately stopped and the compressor is stopped after CSD minutes.
DAD	0...30 min	Delay before door open alarm warning.

CSD	0...30 min NO	Compressor/heater stop delay after door has been opened. If CSD=NO compressor/heater never stops due to the door opening.
D1O	NON; DOR; ALR; IISM; RDS	DI1 digital input operation NON : digital input 1 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. RDS : when the input is on, a defrost is started (remote control).
D1A	OPN; CLS	DI1 digital input activation. OPN : on open CLS : on close
D2O	NON; RDS; DSY	DI2 digital input operation. NON ... RDS : See D1O. DSY : defrost synchronization. The controllers will all start and end defrost together. The first controller in defrost will get defrost of all the others started. The last controller ending defrost will get defrost of all the others stopped.
D2A	OPN; CLS	DI2 digital input activation. See D1A.
LSM	NON; MAN; ECO; DI1; DI2; RTC	Light control mode NON : light output not controlled. MAN : light output controlled through button (if OAx=LGT). ECO : lights activated/deactivated following the ECO state. DIx : lights activated/deactivated following the DIx state. RTC : lights change state at STT time, then they revert their state at EDT time.
LSA	OPN; CLS	Light activation (only with LSM=ECO, DIx or RTC). OPN : lights on with DIx opened, ECO mode deactivated or at EDT time. CLS : lights on with DIx closed, ECO mode activated 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; 2CU; 2EU; ALO; ALC	AUX 1 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. 2CU : output programmed for the control of an auxiliary compressor. 2EU : output enabled for the control of the electrical defrost of a second evaporator. ALO : contacts open when an alarm condition occurs. ALC : contacts make when an alarm condition occurs.
OA2	See OA1	AUX2 output operation. See OA1.
2CD	0...120 sec	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.
OS1	-12...12°	Probe T1 offset.
T2	NO/YES	Probe T2 enabling (evaporator).
OS2	-12...12°	Probe T2 offset.
T3	NON; DSP; CND; 2EU	Auxiliary probe T3 operation NON : probe T3 not fitted. DSP : temperature T3 to be displayed. CND : condenser temperature measurement. 2EU : second evaporator temperature measurement.
OS3	-12...12°	Probe 3 offset.
AHM	NON; ALR; STP	Operation in case of high condenser alarm NON : high condenser alarm inhibited. 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.
AHT	-50...110°	Condensation temperature alarm (referred to T3 probe).
TLD	1...30 min	Delay for minimum temperature (TLO) and maximum temperature (THI) logging.
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 -58 ... 230°F
SIM	0...100	Display slowdown.
ADR	1...255	BR1-27 address for PC communication.



5. WIRING DIAGRAMS



6. TECHNICAL DATA

Power supply
BR1-27...W 100-240Vac $\pm 10\%$, 50/60Hz, 3W

Relay output max loads (240Vac)

Output	Model	BR1-27..S...-	BR1-27..Q...-
Compressor		16A resistive 3.6 FLA 21.6 LRA	12A resistive 3.6 FLA 21.6 LRA
Evap. Fan		16A resistive 3.6 FLA 21.6 LRA	12A resistive 3.6 FLA 21.6 LRA
Defrost		7A resistive 1 FLA 4 LRA	7A resistive 1 FLA 4 LRA
Auxiliary loads 1		7A resistive 1 FLA 4 LRA	7A resistive 1 FLA 4 LRA
Auxiliary loads 2		7A resistive 1 FLA 4 LRA	7A resistive 1 FLA 4 LRA

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

Measurement Range
-50...110°C, -58...230°F
-50 / -9.9 ... 9.9 / 110°C

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.
Pollution degree 2

Approvals and Reference Norms

- RoHS 2011/65/UE
- EN50082-1; EN55022 (Class B);
- EN60730-1; EN60730-2-9;

BR1-27 BEDIENUNGSANLEITUNG

Wir danken Ihnen, dass Sie sich für ein Produkt der Firma LAE electronic entschieden haben. Lesen Sie vor der Installation des Gerätes bitte aufmerksam die vorliegende Bedienungsanleitung durch: Nur so können wir Ihnen höchste Leistungen und Sicherheit garantieren.

1. INSTALLATION

- Das Gerät misst 71x97x61 mm (LxHxT) und muss an einer DIN-Schiene so befestigt werden, dass keine Flüssigkeitsinfiltrationen möglich sind, welche schwere Schäden am Gerät selbst hervorrufen und dessen Sicherheit beeinträchtigen können.
Die Elektroanschlüsse ausführen (siehe hierzu die "Schaltpläne"). Zur Vermeidung von elektromagnetischen Störungen die Fühler und Signalkabel getrennt von den Starkstromleitungen anbringen.
Den Fühler T1 so in der Zelle positionieren, dass die Konservierungstemperatur des Produktes gut gemessen werden kann.
Den Fühler T2 auf dem Verdampfer an der Stelle des maximalen Reifeansatzes befestigen.
Die Funktionen des Fühlers T3 werden vom Parameter T3 bestimmt. Bei T3=DSP misst der Fühler die auf dem Display anzuzeigende Temperatur; bei T3=CND erfasst der Fühler die Verflüssigungstemperatur und muss somit zwischen den Rippen des Verflüssigungssatzes positioniert werden; bei T3=2EU misst der Fühler die Temperatur des zweiten Verdampfers und muss an der Stelle des maximalen Reifeansatzes befestigt werden; bei T3=NON ist der dritte Fühler deaktiviert.
Bei der ersten Einschaltung oder nach einem langen Stromausfall könnte das Display "TIM" zeigen: in diesem Fall soll eine beliebige Taste gedrückt werden, um der Summer abzuschalten, dann soll die korrekte Echtzeit überprüft werden (MIN, HRS).

2. DISPLAY INFO

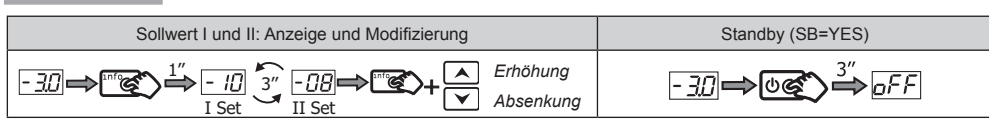
Table with 2 columns: Symbol and Description. Symbols include Alarm, Wärmeregelausgang, Lüfterausgang, Abtauangang, etc. Descriptions include Übertemperaturalarm, Untertemperaturalarm, etc.



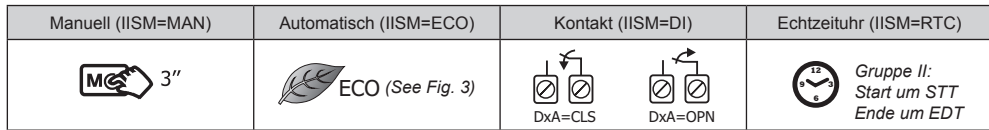
Im Alarmfall, wird der Alarmsummer durch das Drücken einer beliebigen Taste stummgeschaltet.

Navigation and Settings diagram showing the sequence of button presses to navigate the display menu: Info Display-Angaben, Navigation, Einstellungen Echtzeituhr, Tastensperre, THI / TLO / CND -Löschen.

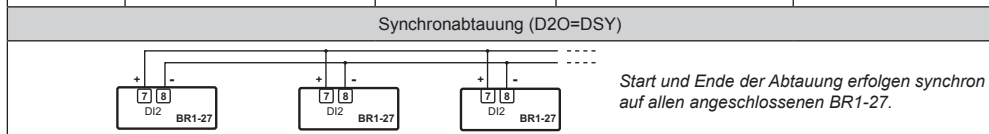
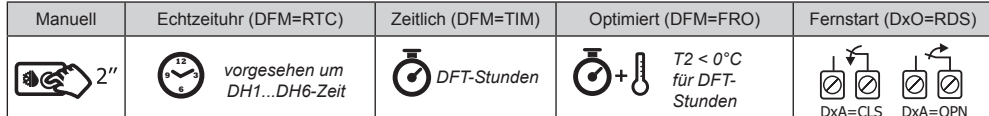
3. FUNKTION



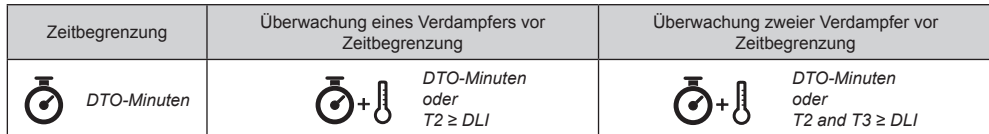
3.1 AUSWAHL DER ZWEITEN PARAMETERGRUPPE



3.2 ABTAUSTART



3.3 ABTAUENDE



Wiederaufnahme des Wärmeregelszyklus. Nach einer Abtauung bleiben alle Ausgänge, falls DRN über Null liegt, für DRN Minuten ausgeschaltet, damit das Eis schmelzen und das Wasser abfließen kann.

4. KONFIGURATIONSPARAMETER

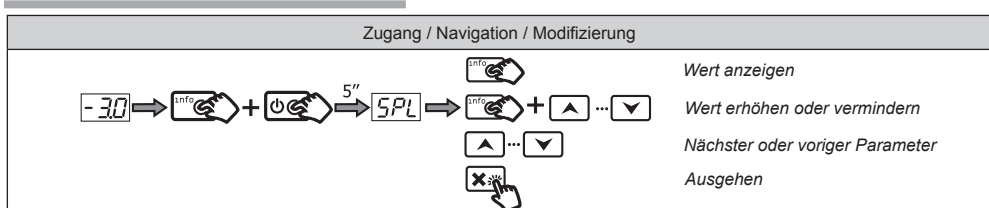
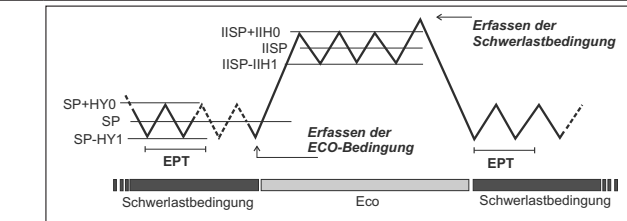


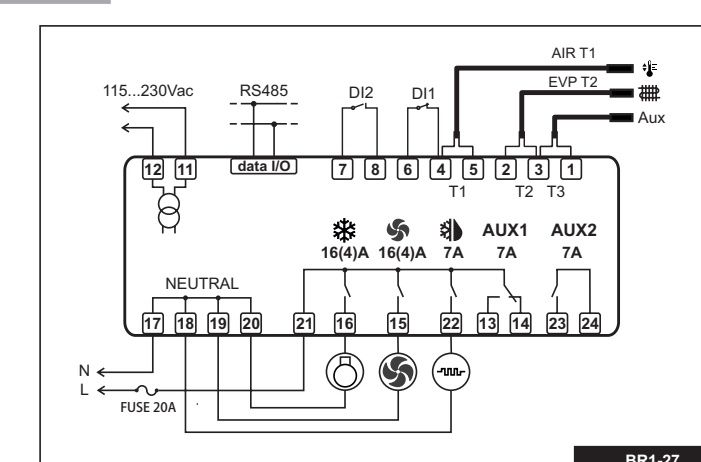
Table with 3 columns: PAR, BEREICH, BESCHREIBUNG. Lists parameters like SPL, SPH, SP, C-H, HY0, HY1 and their ranges and descriptions.

Main parameter table with columns: Code (CRT, CT1, CT2, DFM, DFT, DFB, DH1, DHD6, DLI, DTO, DTY, DSO, SOD, DPD, DRN, DDM, DDY, FID, FDD, FTO, FCM, FDT, FDH, FT1, FT2, FT3, ATM, ALA, AHA, ALR, AHR, ATI, ATD, ACC, IISM, IISL, IISH, IISP, IIH0, IIH1, IIDF, IIFC, ECS, EPT, SB), Range, and Description.

DSM parameter table with columns: Code, Range, and Description. Includes parameters like DAD, CSD, D10, D1A, D20, D2A, LSM, LSA, STT, EDT, OA1, OA2, 2CD, OS1, T2, OS2, T3, OS3, AHM, AHT, TLD, TDS, AVG, SCL, SIM, ADR.



5. SCHALTPLÄNE



Product image of the BR1-27 device with the title 'INSTRUCTIONS FOR USE BEDIENUNGSANLEITUNG'.

Company logo for lae ELECTRONIC, address: VIA PADOVA, 25 31046 ODERZO /TV /ITALY, and contact information.

Technical data section: 6. TECHNISCHE DATEN, including Spannungversorgung, Relaisausgänge (240Vac), and other technical specifications.

Operating conditions and certifications: Eingänge, Messbereich, Messgenauigkeit, Batteriepuffer, Betriebsbedingungen, Zertifizierungen und Bezugsnormen.

Final product information: BR1-27 INSTRUCTIONS FOR USE BEDIENUNGSANLEITUNG and model number 0L0017R01-01.