

WUBC : Instructions for installation and use

We thank you for choosing an LAE controller. Before proceeding to the installation, please read this instruction sheet carefully; only in this way will you obtain maximum performance and safety.

1. INSTALLATION

- 1.1 The WUBC must be protected by an enclosure, please make sure that no moisture or liquid infiltrates and damages the unit.
- 1.2 The unit must work with ambient temperature between $-10^{\circ}\text{C} \dots +50^{\circ}\text{C}$ and 15%...80% relative humidity. To reduce the effects of electro-magnetic interference, locate the probe cables and the unit as away as possible from power lines.
- 1.3 Probes, power supply and outputs must be connected strictly according to the indications appearing on the board; the flat cable of the remote display WRU/WRD must be connected to the relevant connector by making sure that the mechanical polarity is respected. Please make sure that the mains selection corresponds with the actual line voltage.
- 1.4 Probe T1 measures air temperature and is used for temperature control. Probe T2 measures the evaporator temperature and must be located in a place where the maximum frost growth occurs. Caution: where delicate or valuable products have to be maintained under strict conditions, please use a different controller for limit and alarm functions.

2. CONTROL PARAMETERS

The adaptation of the controller to the system that it controls is achieved through the parameters in the set up, listed on table 1. You have got access to the parameter menu by pressing buttons (▼)+[SET]+(▲) for 5 seconds. Scroll the parameter list via keys (▲) and (▼) until you achieve the desired one, display its value by pressing [SET] and modify it via [SET]+ (▲) and [SET]+ (▼). The exit from the setup takes place automatically after 30 seconds of no button activation or immediately by pressing buttons (▲)+(▼).

SL	-50..SH(°)	minimum temp. Set	FD	0.. 10(min)	fan restart delay
SL	SL. +99 (°)	Maximum temp. set	CF	0.. 10 (min)	Compressor rest time
SP	SL. SH (°)	actual temperature set	CF	0.. 10	Compressor duty cycle
HY	-22..+20 (°)	Thermostat hysteresis	DS	N/Y	Door switch enable
DF	0..24	defrost frequency 2.4h	T2	N/Y	probe 2 enable
DL	0..+70 (°)	defrost limit temperature	TS	0..99	display slowdown
DT	1..99 [min]	defrost timeout	SC	°C/°F	Readout scale
DM	OF/EL/HG	Defrost mode	O1	-20..+20 (°)	probe T1 offset
DR	0..20 [min]	drain down	O2	-20..+20 (°)	probe T2 offset
DD	0..99 [min]	Defrost display control			

Table 1

The setpoint value SP can always be display by pushing key [SET] and programmed within the SL and SH limits via [SET]+ (▲) or (▼).

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3. DISPLAYS

- 3.1 During ordinary control. For 4 seconds from the power-up the display illuminates a dash (self-check phase), then temperature T1 appears. The temperature is treated by the microprocessor in such a way as to display it in the most meaningful way. To achieve this, the temperature can be corrected by the offset O1 and displayed in degrees Celsius or Fahrenheit, depending on the value set to SC.

Caution: If you change the readout scale you must then **IMPERATIVELY** re-configure the parameters relating to the absolute temperatures (SP, DL etc.) and the hysteresis HY.

By means of parameter TS it's possible to reduce the display fluctuations by simulating the behaviour of product core temperature. The slowdown is proportionated to TS parameter value. To display temperature T2 press keys (▲).

In case of overrange, the display shows "OR".

- 3.2 During defrost. If parameter DD is given a value greater than 0, "dF" is displayed all through defrost and beyond defrost until its value programmed in minutes is over.

4. TEMPERATURE CONTROL

Temperature control is based on the comparison between temperature T1, the programmed setpoint SP and the hysteresis HY. The refrigerator off switching temperature is determined by setpoint plus differential. Ex.: setpoint=-20; hysteresis=04, relay off with TA= -20°C and on with TA=-16°C.

The actual compressor cut-in is only possible if the minimum off time has elapsed since the last cutout. This off time is CR.

The relay status is signalled by the relevant dot on the display.

If probe T1 fails, the display shows "E1" and the compressor is controlled with a fixed time established by CF. This determines the running time with 10 minute cycles.

Example: CF=06, 6 minutes On, 4 minutes Off.

5. DEFROST

Defrost takes place automatically when the built-in timer matches the time needed to obtain the selected defrost spread over 24 hours. For example; by setting DF to 4, in this case there will be 4 defrosts per day, i.e. 1 every 6 hours. By setting DF=0, then timed defrost function is excluded. Defrost can be started manually by pressing button (▲)+(▼) simultaneously.

The built-in timer is set to zero every time the unit is powered up and every time defrost starts.

- 5.1 Once that defrost has been started, the outputs are controlled by DM according the following table:

DM	Defrost	Compressor	Fans
OF	Off	Off	On
EL	On	Off	Off
HG	On	On	Off

- 5.3 Defrost terminates either when time DT elapses or, if the evaporator probe is enabled – T2=Y - and operates correctly (no fault), when temperature DL is measured.

- 5.4 Now, if parameter DR is greater than 0, before cooling starts, all the outputs remain off for the time set to DR. This phase is called drain down and allows a complete ice melting on the evaporator. In the event of probe T2 failure, "E2" is displayed.

6. EVAPORATOR FAN CONTROL

- 6.1 During temperature control, the fans run continuously however, their operation can be related to the door switch. By setting DS to Y, you enable fan control, therefore, when the door is opened the fans are stopped immediately and they re-start when the door is closed.

- 6.2 If during defrost the fans are stopped, after defrost they re-start when the time FD has elapsed. The fan relay status is signalled by the relevant dot on the display.

Williams Universal Budget Controller.



Led display.

- Normal cabinet temperature (-18).
- Probe 1 failure (E1).
- Probe 2 failure (E2).
- Led dot against icon, compressor running (•).
- Led dot against icon, evaporator fan running (•).
- Led display, defrost in operation (DF).

SET UP PROCEDURE

To access parameters, press and hold keys in the following sequence, (DECREASE ∇), $\frac{1}{2}$ and (INCREASE \blacktriangle), for approximately 4 seconds. 'SL' will appear on the LCD display. Use \blacktriangle and ∇ keys to adjust

To select each parameter, press $\frac{1}{2}$ and hold. Use \blacktriangle and ∇ keys to adjust

Serial	Description	Code	Settings	Set Ups						
				+1 to +4 (Refrigerator General Purpose)	0 to +3 (Refrigerator - Prep Counter, Blown & Ducted Weld)	-1 to +2 (Meat)	0 to +3 (Chilled Food)	Counter with Hot Gas Defrost	Counter or Upright Freezer without door fan switch	UPRIGHT -18 to -22 Freezer lifted with door fan switch
1.	Minimum set point low	SL	-50°	0°C	-1°C	-1°C	-1°C	-1°C	-1°C	-28°C
2.	Maximum set point high	SH	+99°	+10°C	+6°C	+5°C	+5°C	+6°C	+6°C	-15°C
3.	Its set point	SP	Low° High°	+1°C	0°C	-1°C	0°C	0°C	0°C	-20°C
4.	Its hysteresis	HY	-22° +20°	+4°C	+4°C	+3°C	+3°C	+3°C	+3°C	+4°C
5.	Defrost frequency	DF	0 to 24	4	6	6	6	12	4	4
6.	Defrost limit temperature	DL	0° to 70°	+10°C	+10°C	+10°C	+10°C	+5°C	3°C	+3°C
7.	Defrost time out	DT	1 to 99 in minutes	13 Min	22 Min	18 Min	20 Min	4 Min	20 Min	20 Min
8.	Defrost mode	DM	Off / electric / hot gas	Off	Off	Off	Off	HG	EL	EL
9.	Drain down	DR	0 to 20 in minutes	0 Min	0 Min	0 Min	0 Min	1 Min	2 Min	2 Min
10.	Display in defrost	DD	0 to 99 in minutes	18 Min	20 Min	20 Min	18 Min	5 Min	10 Min	10 Min
11.	Fan restart display	FD	0 to 10 in minutes	0 Min	0 Min	0 Min	0 Min	1 Min	3 Min	3 Min
12.	Compressor rest time	CR	0 to 10 in minutes	3 Min	3 Min	3 Min	3 Min	2 Min	3 Min	3 Min
13.	Compressor duty cycle	CF	0 to 10	5	5	5	5	5	5	5
14.	Enable door switch	D3	yes No	No	No	No	No	No	NO	YES
15.	Enable T2 probe	T2	yes No	No	No	No	No	YES	YES	YES
16.	Temperature slow down	TS	0 to 99 in minutes	3 Min	3 Min	3 Min	3 Min	0 Min	3 Min	3 Min
17.	Readout scale	SC	°C °F	°C	°C	°C	°C	°C	°C	°C
18.	T1 offset (Air probe)	O1	-22° +20°	0°C	0°C	0°C	0°C	0°C	0°C	0°C
19.	T2 offset (Evap probe)	O2	-22° +20°	0°C	0°C	0°C	0°C	0°C	0°C	0°C



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INSTRUCTIONS FOR USE AND INSTALLATION OF THE LAE SDU95 REFRIGERATION CONTROLLER

The SDU95 is a controller allowing temperature and defrost control of static and ventilated refrigerators. To get best performance, before installing and using it, please read this instruction sheet carefully.

1. INSTALLATION

For correct installation, please refer to Williams Refrigeration Australia Pty Ltd

2. BASIC FUNCTIONING

After having installed the instrument and carried out the connections, power the instrument. The display shows the temperature measured by the probe; the two LED's indicate the output and defrost status.

The standby button will switch off the refrigeration system and whilst in this mode an LED will be illuminated.

3. CONTROL PARAMETER CONFIGURATION (SETUP)

Before proceeding to SETUP in order to configure the instrument to work as desired, please read the next paragraphs carefully.

Access to SETUP is obtained by keeping the keys "DECREASE" + "ENTER" + "INCREASE" pressed for 3 seconds, exactly in this sequence.

To select the desired parameter, press key "INCREASE". To show its value press "ENTER" and if necessary change it via "INCREASE" or "DECREASE"; store it with "ENTER". No key activation within 10 seconds causes the controller to switch over to the basic functioning.

SL	-9	...	99°C	Minimum set point limit
Sh	SL	...	99°C	Maximum set point limit
hY	01	...	10°C	Cooler switching hysteresis (differential)
Pc	00	...	10min	Pause of cooler
pO	-9	...	09°C	Probe offset
PF	00	...	10*10%	Duty cycle with probe failure or overrange
dt	01	...	24h	Interval between defrosts
dd	01	...	99min	Defrost duration
do	00	...	01 flag	Defrost optimisation
dF	-1	...	99 flag	Display during defrost
AL	-9	...	(SL) °C	Low alarm threshold
Ah	(Sh)	...	99°C	High alarm threshold
Ad	-1	...	99 flag	Alarm delay
SI	00	...	99	Product Simulation feature
YY	01	flag		DO NOT CHANGE

3.1 Thermostat Parameters

"SL" and "Sh" represent the limits within which the set point can be programmed after exit from SETUP. To program the desired value, while key "ENTER" is kept pressed, press key "INCREASE" or "DECREASE". When "ENTER" is released, the value is stored immediately.

"hY" - Hysteresis which, added to the set point, determines the switching on threshold of the cooler.

"Pc" - if different to 0, it represents the minimum off time between the switching off and on of the relay, regardless of the temperature.

"Po" - it allows to program an offset between the measured and the displayed temperature.

"PF" - this parameter determines the cooler "duty cycle" in case of probe failure or overrange, ie the on and off times, calculated upon a 10 minute cycle and expressed in 1/10th. For example, if "PF" = 6, the cooler will work for 6 minutes and remain off for 4 minutes. The minimum intervention time, during which the operator cannot intervene to interrupt the cycle, has 10 minute duration. When this command is active, "PF" is displayed and defrosts are suspended. If the controller is equipped with a buzzer, this will be turned on.

3.2 Defrost Parameters

"dt" - the interval in hours between a defrost and the next; defrost duration is not included. In case of a power failure, when the power comes on again, the defrost timer restarts the counting from the point where it was interrupted, with ± 30 minutes approximation. For example, the programmed interval is 4 hours, after 2 hours a power failure occurs with 5 minute duration. When power comes on again, the timer restarts counting and after 1 1/2 hours approximately, a defrost will take place.

"dd" - the duration in minutes of defrost, ie the cooler off cycle.

"do" - if set at 1, it allows defrost optimisation, by considering as defrosts cooler pauses of \geq "dd" duration. If "do" = 0, optimisation will be excluded. For example, "dd" = 20 minutes. If the cooler remains off for 20 minutes without interruption, the timer will be reset and as a consequence, the start of the next defrost will be postponed.

"dF" - it allows selecting the display indication during defrost. If "dF" = 0, then the temperature measured by the probe will continue to be displayed; if -1, during defrost and until the set point is reached the display will show "dF". If "dF" = 1 ... 99 minutes, "dF" will stay on display until the time programmed has elapsed.

While the instrument is in the basic functioning, to start a manual defrost keep key "INCREASE" and "DECREASE" pressed simultaneously for 3 seconds; to terminate defrost, press the two keys again.

3.3 Alarm Parameters

"AL" and "Ah" determine, respectively, the low and the high alarm threshold, expressed in absolute temperatures. It's not possible to set the two thresholds within the minimum and maximum set point limits. When the alarm is entered, the display shows "AL" and, in alternation, the temperature; if built-in, a buzzer will be switched on. The alarm condition is stored, therefore if not one of the keys is pressed (MUTE function) the indication "AL" stays on display and the buzzer remains in operation regardless of the temperature. If MUTE function is entered, the buzzer will be turned off; when the temperature comes within the set point limits, the indication "AL" disappears.

"Ad" - it allows to: exclude the alarm function (-1); enable the alarm with immediate signalling as soon as the condition is detected (0); program a delay between the detection of the alarm condition and its signalling (1 ... 99 min).

3.4 Product Simulation Feature

It is possible to display the assumed product code temperature by means of adjusting the "SI" parameter which in effect reduces the speed at which the temperature display is updated.

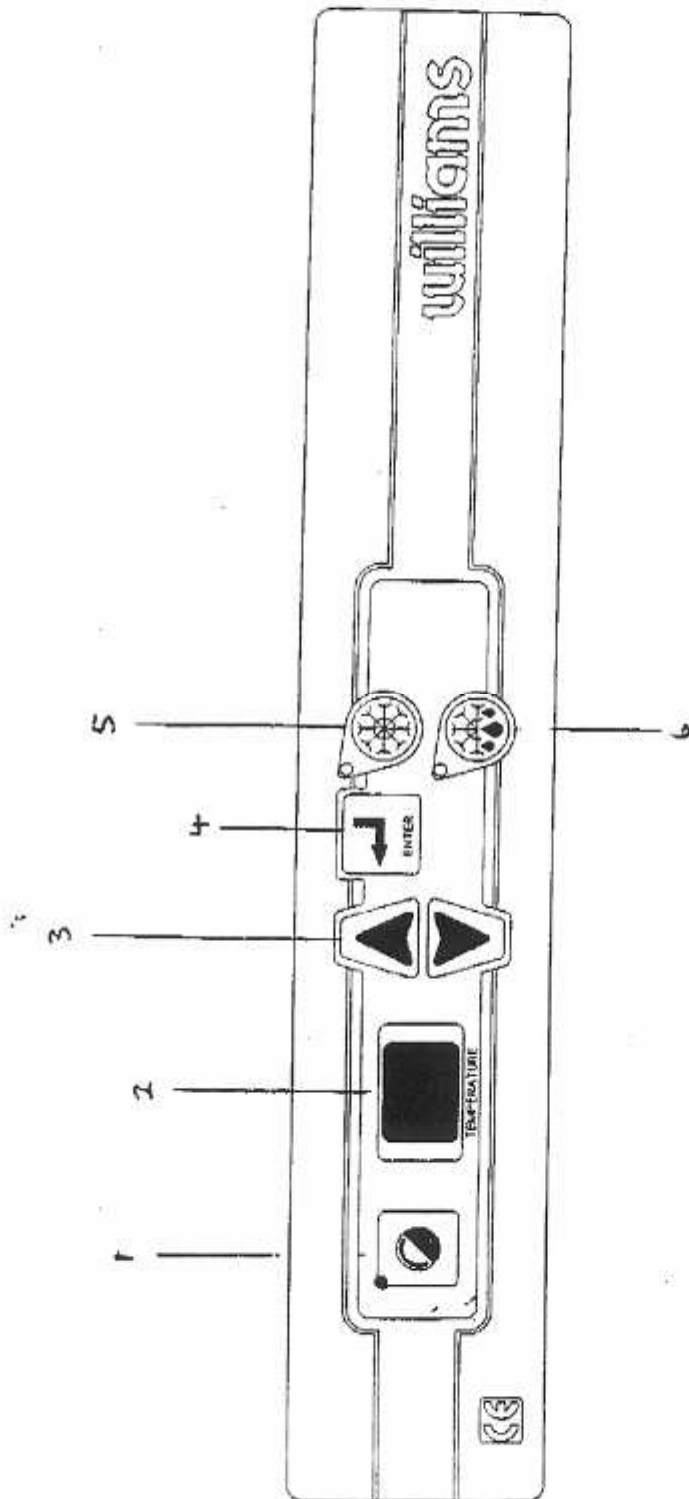
When the parameter SI is set at "00" then the display is indicating the actual temperature measured by the sensor but as this value is increased from 01 to 99 the display response time will be slowed down.

The greater the number, the slower the display will be to respond or update so basically at a setting of 01 you are simulating a minute product mass and at 99 an extremely large mass.

NOTE: It is important to note that only the display response is affected and the temperature control and alarms are always based on the instantaneous air temperature.

REFRIGERATOR WITH SDU95

1. **ON/OFF SWITCH**
To turn the refrigerator on or off, you must hold your finger on this button for approx. 5 seconds. When in off mode temperature display will show -- & LED will be illuminated, while in on mode, the cabinet temperature will be displayed.
2. **TEMPERATURE DISPLAY**
Displays current cabinet temperature
3. **RED ARROW UP & DOWN**
Depressing the 2 buttons simultaneously will commence a defrost for a period of 20 minutes. Repeating the procedure will terminate the defrost.
4. **ENTER**
Depressing this button will display thermostat set point, Set point can be adjusted by holding down the enter button and pressing the arrow buttons either up or down.
5. **SNOWFLAKE/ICE with water droplets underneath**
When LED is illuminated, cabinet has entered a defrost period.



LAE SDU 95 Controller Set Up Procedure Refrigerated Cabinets

To Setup the Controller, press the following keys, 'DECREASE', 'ENTER' and 'INCREASE', for 3 seconds exactly in this sequence. 'SL' will then appear on the screen.

To select each Parameter, Press 'INCREASE' key. To show it's value, press 'ENTER'. To change the value and set the parameters, press 'INCREASE' or 'DECREASE' keys. Once Parameters have been set, switch OFF then ON once again.

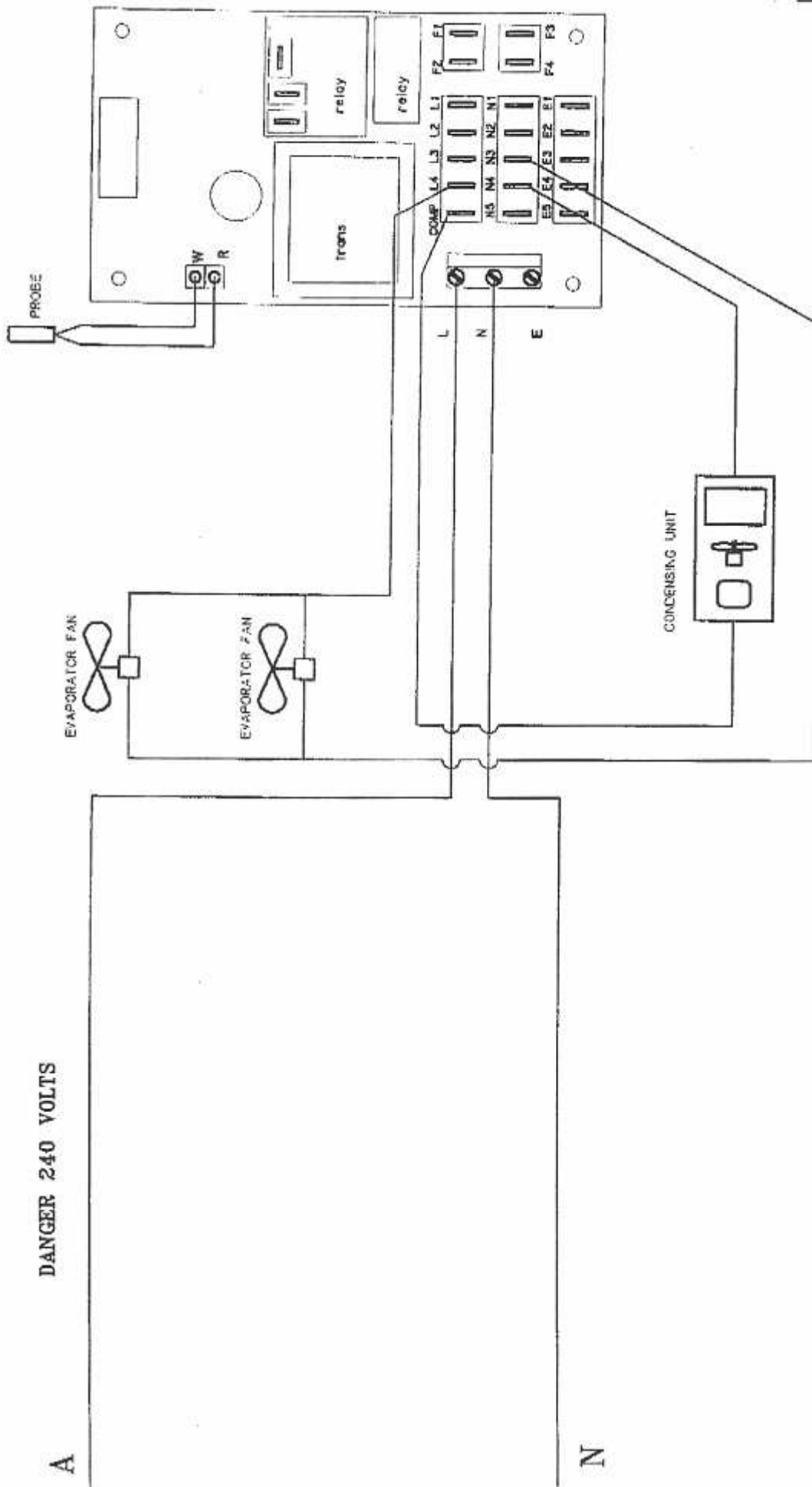
Display	Set At	
SL	0	Min Set Point
Sh	6	Max Set Point
hy	2	Hysteresis (Differential)
Pc	1	Min Time between Cut Out and Cut In
Po	0	Probe Offset
PF	5	Duty Cycle with Probe Failure
dt	6	Interval between Defrosts
dd	15	Defrost Duration
do	0	Defrost Optimisation
df	0	Display During Defrost
AL	-2	Low Alarm Threshold
Ah	10	High Alarm Threshold
Ad	-1	Alarm Delay
SI	0	Product Simulation Feature
yy	1	DO NOT CHANGE

To Set the Temperature, press "ENTER" key, (keep finger on the key), then press either "INCREASE" or "DECREASE".

DANGER 240 VOLTS

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WILLIAMS REFRIGERATION

WIRING DIAGRAM

SDU95 CONTROLLER