

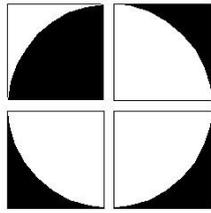
User Manual

English

TERMAKS

TERKB8400F
TERKB8400FL

The original document KB8000L
of the manufacturer is obligatory.



Termaks

USERS MANUAL

Series KB8000 L

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SYSTEM INFORMATION

The main functions

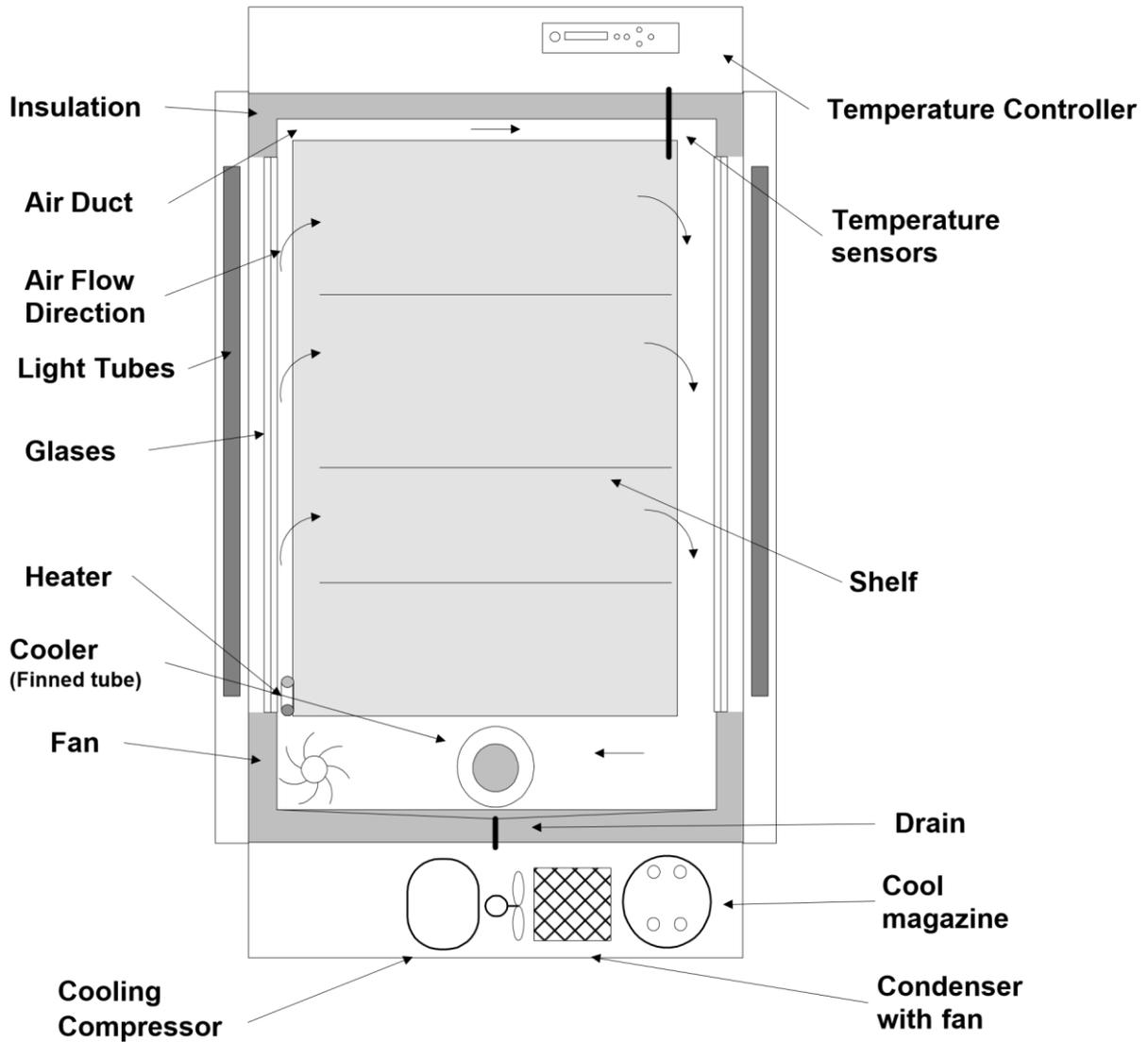
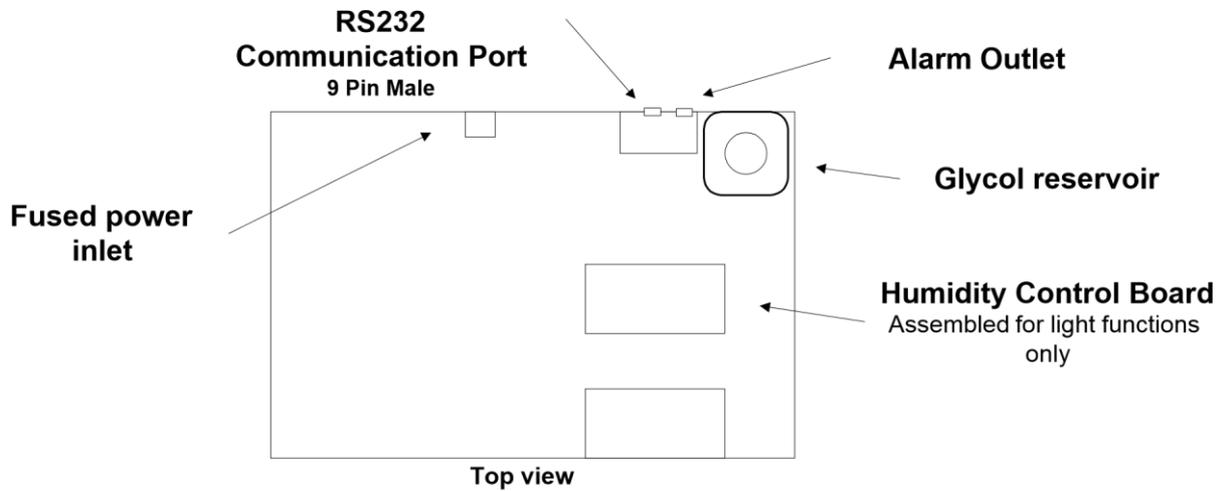
- Temperature control, heating and cooling
- Light control
- Automatic, independent safety thermostat for material protection
- Acoustic and visual alarm system
- Remote alarm output
- Visual message system
- Real time program system with ramp function □ Printer report system (Optional)

Specials/Upgrades

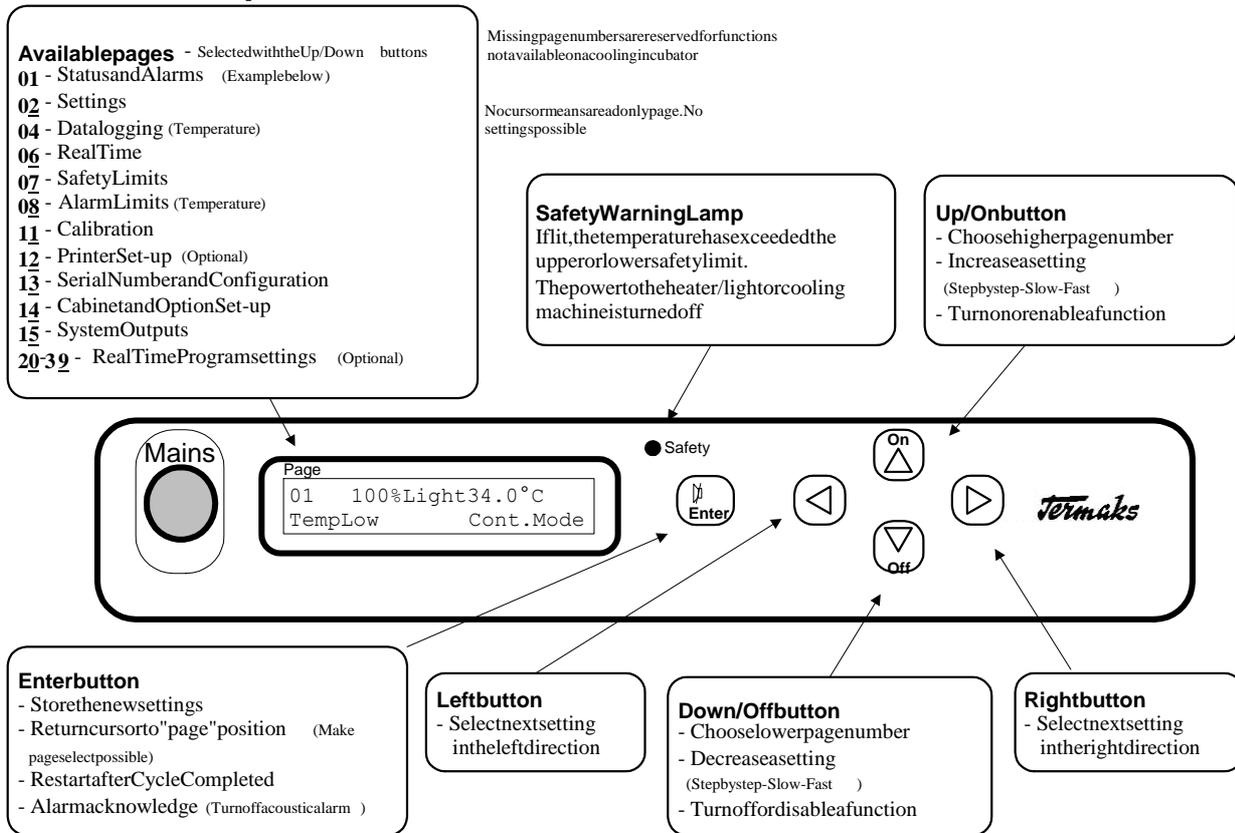
The microprocessor based controller can be reloaded with a new software in an easy way via the serial port from a Windows based PC. This is actual if the a software upgrade is needed or if a special software is developed in order to meet a customers special needs

If you need a special function not included in the system, please contact Termaks trough your local vendor.

Major parts



Front Panel Operations



How to choose a page

- Hit the **Up** or **Down** button for displaying the next available page number, up or down.
- If one of the buttons is kept in, the page number will automatically count up or down. First slowly, then fast.
- It is not possible to change page while changing settings (See below)
- **Note:** In order to avoid accidental changes of settings, the system will automatically return to page 01 one minute after the last button operation.

How to change a setting

- Go to the page where the actual setting is displayed (See above).
- Hit the **Right** button. An arrow or a text will start flashing, clearly indicating that a particular value is selected for change. Eventually, make new hits for finding the actual setting. It is possible to step back by using the **Left** button.
- Load the new value by using the **Up** or **Down** buttons. Short hits makes step by step, up or down. Kept in, the value will count up or down, first slowly, then fast. The counting stops when coming to the end of the valid range for the particular setting. Multiple settings can be done within a page.
- Hit the **Enter** button in order to save the new setting(s) into the memory and to make it active. This is a necessary step. Otherwise the changes will be ignored.

How to turn a function on or off

- Go to the page where the status of the actual function is displayed (See above).
- Hit the **Right** button one or more times until an arrow points to the actual function state, On or Off (Sometimes In or Out). It is possible to step back by using the **Left** button

- Change status as decided by hitting the **On** or **Off** button. The new status has immediate effect. It is not necessary to hit the Enter button on order to save it in the memory.

INSTALLATION

Placement

Before placing the cabinet, please take the following points into consideration:

- In order to obtain a good temperature control, places with risk of fast changing temperatures, like inside a sunny window or at a radiator, should be avoided.
- Wet or corrosive atmosphere may harm the electronic parts and the cabinet itself.
- Placing in rooms with moderate temperatures will reduce the power consumption and increase the lifetime of the cooling system.

Drain

This cabinet has an automatic evaporation system for the condense water. External drain system is not necessary.

Power

The cabinet shall be connected to a 230 VAC outlet. Of safety reasons, the outlet must be grounded. If the standard power cord do not fit to the present outlet, it must be replaced with a cord of local standard

Printer

Optionally, a thermal printer (SEIKO DP-414) can be connected to the cabinet for sequentially status printing. (See the section **Printer Report**) It shall be connected to the cabinet via a 9-pin 0-modem cable. When delivered from Termaks, the printer is ready to use, no programming or adjustments.

Computer

A PC can replace the printer. By activating the standard Windows program **HyperTerminal**, the report will be displayed on the screen. The PC shall be connected via a standard 9-pin serial cable.

HyperTerminal settings:

Terminal Keys - Auto Detect - Backscroll buffer lines = 500

Port settings:

9600 b/s - 8 databits – Parity None – Stopbits 1 – Flow Control None - FiFo buffer- Transmit/Receive buffers = 25%

ASCII Setup:

Line Delay 5 mS -Wrap lines that exceeds Terminal with

View:

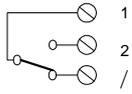
Terminal Font

More detailed information of the setting procedure can be ordered from Termaks

Alarm Output

It is possible to connect a remote alarm system to this cabinet The relay is activated whenever the cabinet is in

a alarm situation.



1
2 Alarm The drawing indicates a normal situation Outlet Maximum load: 8A
/ 230VAC
3

Getting started

- Turn on the cabinet with the **Mains** switch. The **Page 01** will appear in the display Enter your temperature and light settings in **Page 02** as described in the Front Panel Operations
- As soon as the **Enter** button is operated, the temperature and light will start changing towards the set values.

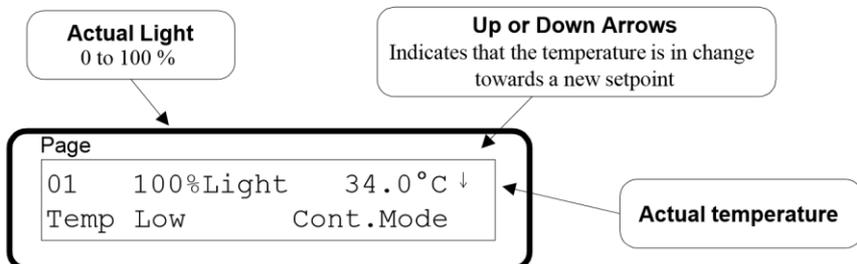
The cabinet will stay continuously at those settings. This is the simplest use of this cabinet.

If you need to use any of the system options, you have to read the description of each function needed for details. In most cases, the page description will give the information necessary to operate a particular function.

DISPLAY PAGE DESCRIPTIONS

Page 01 – Status and Alarms

Main information page
Read only data
Automatic return to this page, one minute after last button hit, from all other pages (Except from page 15)



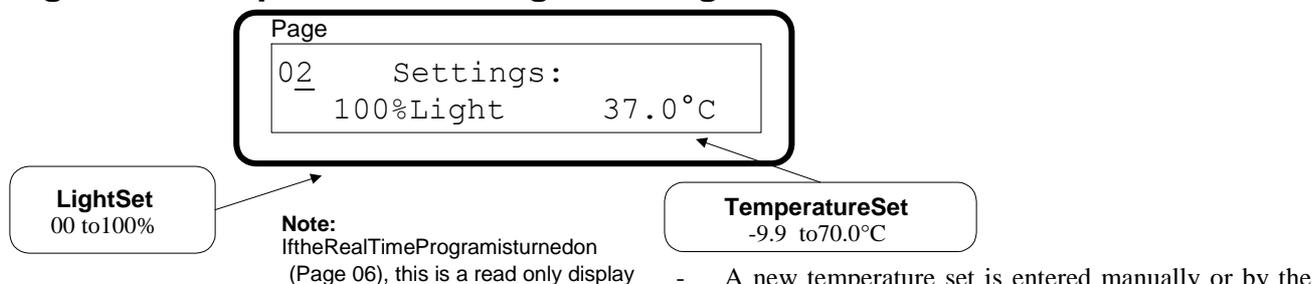
If more than one alarm condition, the alarms will be displayed sequentially

Messages may appear in the alarm area if no alarm conditions

Alarms	Comments
Safety Low	- Outside Low Safety limit (Page 07) (Cooling machine disconnected)
Safety High	- Outside High Safety limit (Page 07) (Heater disconnected)
Temp Low	- Low temperature warning (Page 08)
Temp High	- High temperature warning (Page 08)
Add Glycol!	- Glycol level low
Blank	- No alarm conditions

Messages	Comments
Completed Ramping	- A Timer or Real time cycle has finished
De-icing	- Ramping towards a new temperature (Page 20-39)
Standby	- De-icing.
Cont.Mode	- Cabinet temporarily turned off (Page 20-39)
Prog.Mode	- Continuous mode. Timer and program functions off
Timer Mode	- Real time program on (Page 6)
Blank	- Timer on (Page 02)
	- No messages

Page 02 – Temperature and Light settings



- A new temperature set is entered manually or by the real time program (page 20-39)
- During ramping (page 20-39)
- At power on
- After power a failure.

Page 04 and 05 – Datalogging



The calculations will be done every minute, and starts about one hour after the initial temperature stabilizing. In this delay period, only zeros will be displayed.

All data are cleared if:

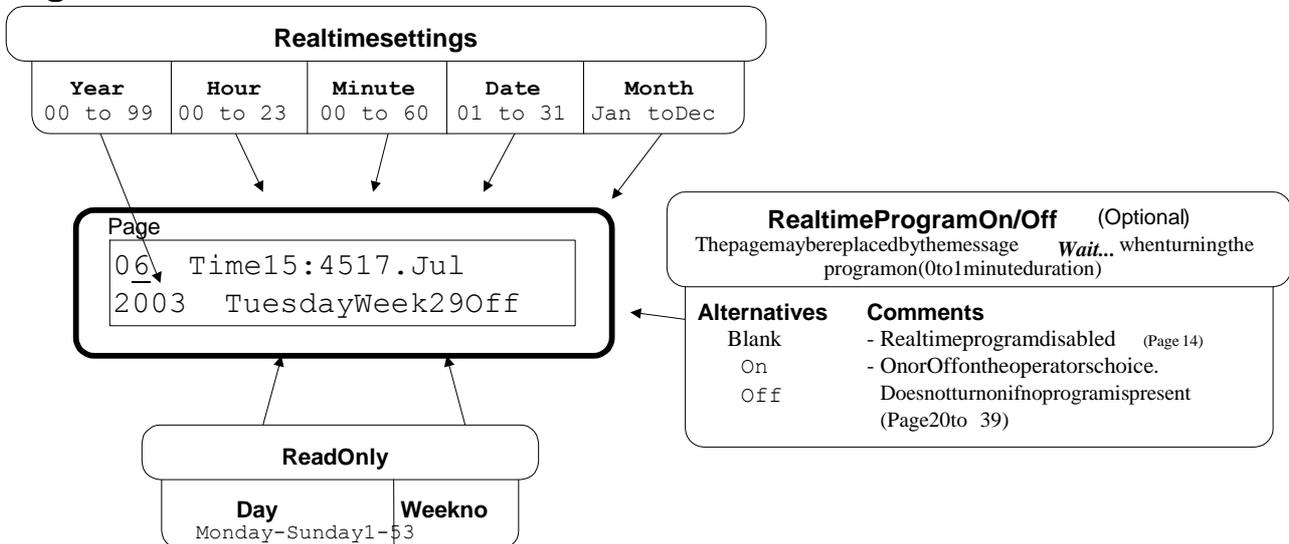
This is read only pages indicating the maximum, minimum and average temperature. This can be a useful aid in the evaluation of a temperature cycle.

An average value very close to the temperature set indicates that the temperature must have been correct during most of the cycle.

Max and Min values close to the average indicates a stable control without any door openings or de-icings.

Max or min values with significant deviation from the average, indicates that the door has been opened for a short time, or a de-ice cycle may have occurred.

Page 06 – Real Time



The real time feature has relevance to the Real Time Program and the Printer Report options only.

If none of those options are used, it is not necessary to set the real time.

The operator can set the date and time. The day name and the week number are automatically calculated by the system.

A week starts Monday morning, and ends Sunday at midnight.

The week numbering is as in a normal European calendar. Week 1 may start in the last days of a year and some years has week number 53

Backup

The Real time Clock will continue even if the cabinet is turned off or disconnected from the power line for several months

Summertime

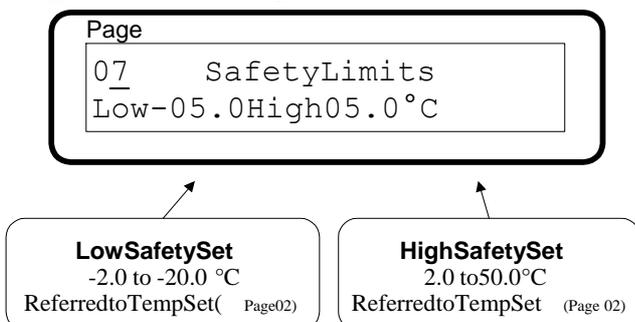
Automatically adjusting for European Daylight Saving Time, DST, is available as an option (Display page 14)

Outside Europe, this option should be disabled.

The DST starts at 02:00 AM, the last Sunday in March and jump to 03:00 AM

The DST ends at 02:00 AM, the last Sunday in October and steps back to 01:00 AM

Page 07 – Safety Limits



The safety band should always be wider than the alarm limit band, display **page 08**.

If one of those high or low limits is exceeded, the heater /light or cooler will be shut off respectively.

For more details, please read the **Temperature Control** chapter.

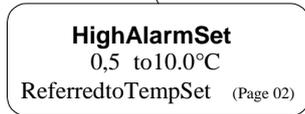
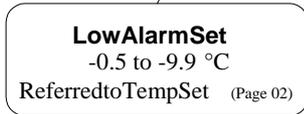
Page 08 – Temperature Alarm Limits



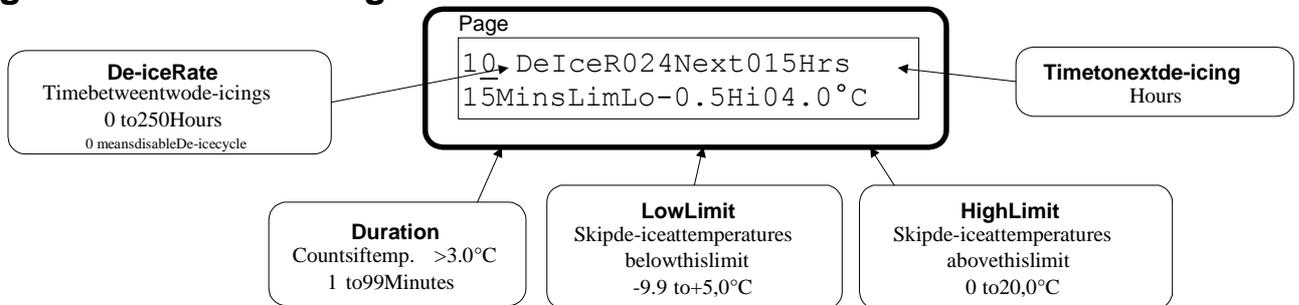
The alarm band should always be less than the safety limit band display **page 07**.

If one of those alarm limits is exceeded, a flashing message will be given in the display **page 01**. A delayed acoustic signal will also appear.

For more details, please read the **Temperature Control** chapter.



Page 10 – De-ice Settings



At lower temperatures, there is a risk of ice build-up on the cool magazine (the finned tube). In order to maintain the cooling capacity and the control accuracy, a periodic de-icing may be necessary.

The need of de-icing will vary from one cabinet to another, depending of the conditions. Therefore, it is possible for the user to enter the de-ice parameters as indicated above.

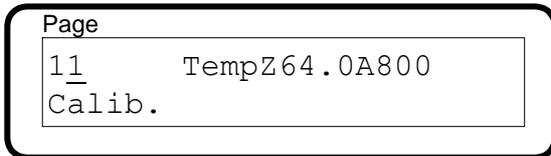
In general, the highest risk of ice build-up is at working temperatures between 0.0 and 4.0°C at a ambient temperature of about 20°C. Number of door openings, ambient temperature, ambient humidity and amount of wet samples inside the cabinet will affect the ice build-up rate.

With lights on, there is a risk of ice build-up even at temperatures above 4,0°C.

During a de-ice period the cooling pump and machine will stop, the fan will run at full speed and the heater will rise the temperature to at least 3,5°C in order to melt the ice. The water is drained trough a sink and evaporated on the cooling compressor. The lights is turned off during this cycle.

At system reset (after a power failure or when turning on the cabinet), the cabinet will go trough a de-ice cycle according to those settings.

Page 11 – Calibration



Two calibration constants can be adjusted in order to bring the temperature measurement equal to the true value according to a control device:

- A - Amplifying factor** (Range), 0 – 999
- Z - Zero point constant** 0 – 99,9 °C

A temperature calibration should be performed as follows:

For a cabinet used at one temperature only, the range calibration is normally not necessary. Therefore, start at point 8

- Place the control device into the middle of the cabinet and let the cabinet stabilize at a low temperature for at least two hours.
- Note the displayed temperature, T_{al} and the true temperature measured in the control device T_{cl} .
- Let the cabinet stabilize at a high temperature for at least two hours.
- Note the displayed temperature, T_{ah} and the true temperature measured in the control device T_{ch} 5 Find current amplifying factor in display **page 11 6** Calculate the new factor by using the formula: $A_{new} = \{(T_{ch} - T_{cl}) / (T_{ah} - T_{al})\} * A$
- Enter A_{new} into display **page 11**
- Let the cabinet stabilize at a temperature in the middle of the normal working range, at least two hours
- Note the displayed temperature T_d and the true temperature measured in the control device T_c 10 Find current zero point constant in display **page 11 11** Calculate the new constant by using the formula:
 $Z_{new} = Z + T_d - T_c$
- Enter Z_{new} into display **page 11**

Examples:

$$T_{al} = 5,0^{\circ}C - T_{cl} = 5,2^{\circ}C$$

$$T_{ah} = 40,0^{\circ}C$$

$$T_{ch} = 40,9^{\circ}C$$

$$A = 801$$

$$A_{new} = \{(40,9 - 5,2) / (40,0 - 5,0)\} * 801 = 817$$

$$T_d = 20,0^{\circ}C$$

$$T_c = 20,4^{\circ}C \quad Z = 64,5 \quad Z_{new} = 64,5$$

$$+ 20,0 - 20,4 = 64,1$$

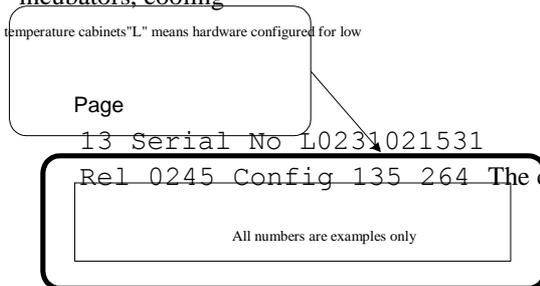
$$Z_{new} = 64,1$$

Page 13 – Serial Number and Configuration

Serial Number

Serial no for this specific This controller may be configured to handle all low controller temperature cabinets in the 8000 series, incubators, cooling

temperature cabinets "L" means hardware configured for low



More about the configuration code:

incubators and climatic chambers.

As standard, it is configured to handle an incubator with or without cooling.

The controller can be upgraded with extra functions by loading a new factory specified code. (See display **Page 14**)

Warning!

This is a specific configuration code for this particular

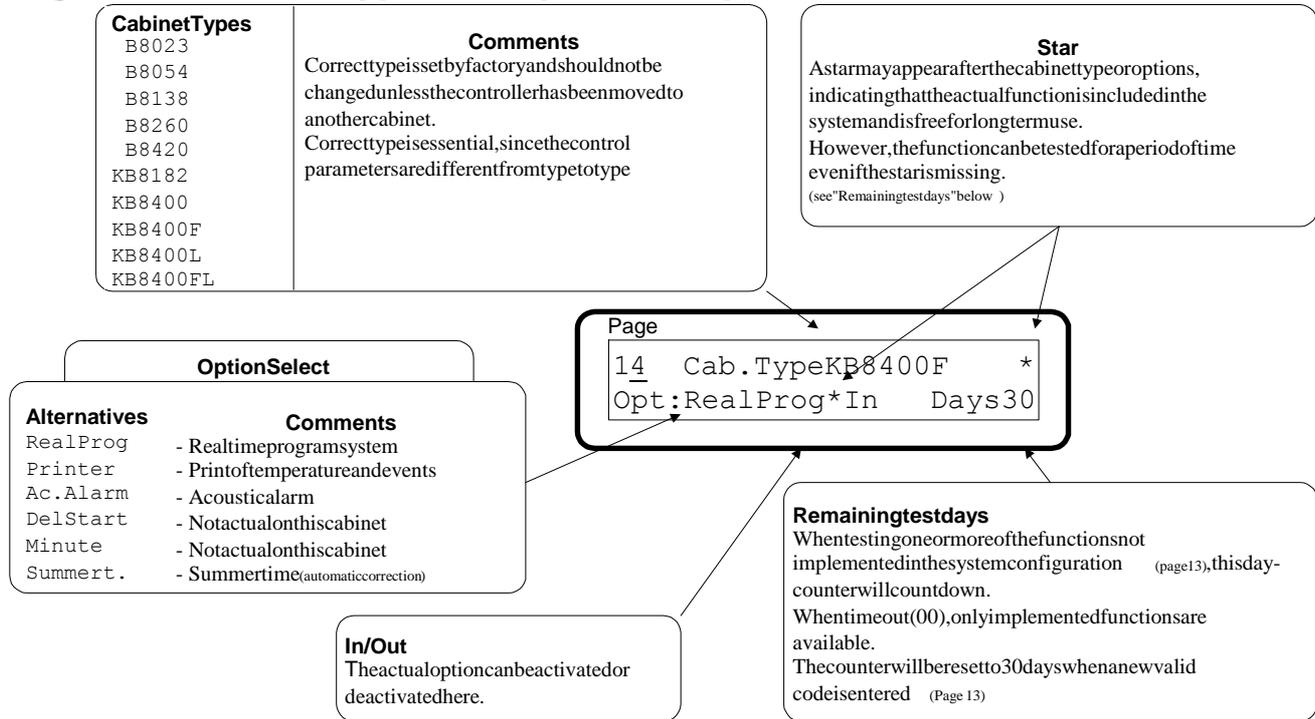
Release Number

Present software release number. this specific controller. controller and shall not be loaded into other units. Any Upgrades or customers specials Resident options can be enabled attempts to do so may result in loosing the possibility to may be loaded via the RS232 for permanent use by entering a enter a new code in the future, unless the controller is port. new Code. (Must be ordered from Termaks) returned to factory.

Configuration Code

A unique code for configuration of

Page 14 – Cabinet Type and Option Setup



Normally, this page is used to activate or deactivate the system options described in this manual. The cabinet type is factory set and should not be changed

How to operate

- Move to "Opt:" with the **Right** button
- Select the desired option with the **Up/Down** buttons
- Move to **In/Out** position with the **Right** button
- Choose **In or Out** with the **On/Off** buttons - Hit the **Enter** button

Warning!

Do not activate a function not included (without the star) unless you really want to test it. Otherwise you may lose the possibility to test functions in the future.

Nonstandard Options

The Printer Report is not standard for this cabinet, unless ordered.

The Real Time Program is normally implemented in the system, unless ordered without it.

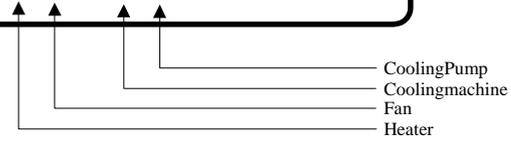
If a star appears behind the option name, the actual function is included in the system and is available for permanent use. However, all options can be tested for a period of time, up to 30 days. An option can be implemented for permanent use by ordering a new configuration code (display page 13) from Termaks.

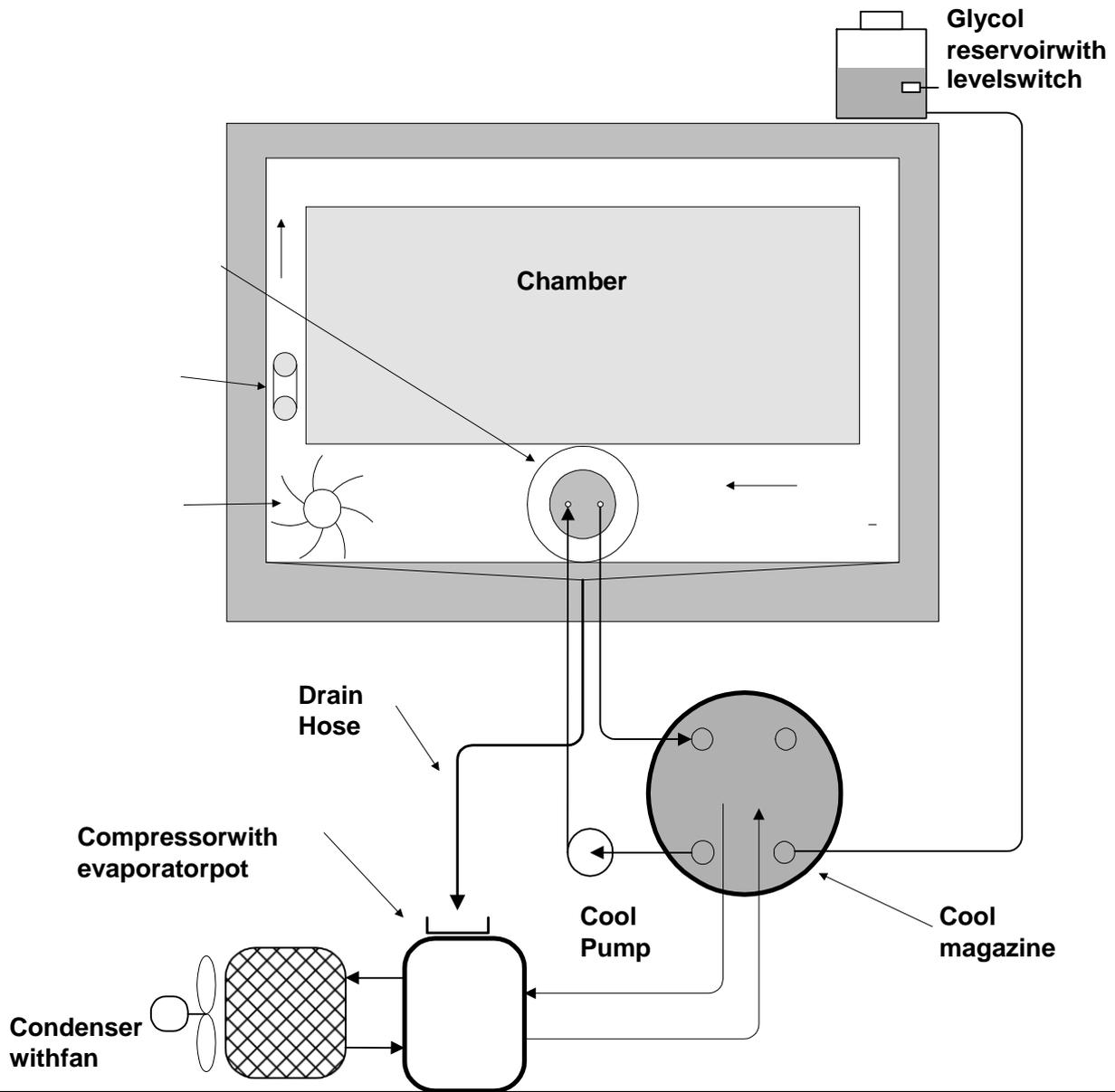
Ordering a new Configuration Code

- The following information is necessary when ordering a new code from Termaks:
- Current Code (**Config** -Display page 13)
- Serial number (**Serial No**-Display page 13)
- Release number (**Rel**-Display page 13)

- Actual option name(s) (Real Time Program – Printer Report)

Page 15 – System outputs

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Page</p> <p>15HeFaDoCoCpDrRrDpWpWdFo</p> <p>11010000000</p> </div>  <p style="margin-left: 20px;"> CoolingPump Coolingmachine Fan Heater </p>	<p>A useful tool when troubleshooting</p> <p>Four output indicators are actual on this cabinet</p> <p>"1" - The system has turned on a device "0" - The system has turned off a device</p> <p>Example: Fa = 1 means that the fan shall be running. If not, the drive electronics or the fan itself must be out of order.</p>
--	--



TEMPERATURE CONTROL

Cooler
(Finned tube)

Heater

Fan

Cooling

Very accurate temperature control, even at temperatures below the ambient temperature, is made possible by implementing a glycol tank as a cool magazine. A pump brings the cold glycol into the cooler in order to keep the temperature stable.

At higher temperatures, when there is no need of cooling, a heating element is used to control the temperature.

How to enter a new temperature setting

1 Go to **Page 02**, by using the **Up/Dn** buttons 2

Hit the **Right** button 2 times until °C turns flashing

3 Load the new set value by using the **Up/Down** buttons. Possible range is -9.9 to 70.0°C . However, the lowest temperatures can not be obtained with the lights on. 4 Hit the **Enter** button

Cooling

The cooling machine will be turned on and off sequentially, and will run at various speeds, depending of the cooling requirements. Since much of the cooling is "stored" in the glycol tank, the system will have cooling capacity even if the machine has been stopped.

At lower temperatures, there is a risk of ice-buildup. Please, read the description of display **Page 10, De-ice Settings**

Fan

A fan circulates the air in order to keep equal temperatures all around inside the cabinet, and to pull cool from the cooler inside the cabinet.

The fan will stop for about 40 sec if the door has been opened (Will not work at temperatures close to the ambient temperature).

Safety thermostats (Display page 07)

High and low temperature safety thermostats for protection of the samples and the cabinet itself are built into the electronic system, but their electronic parts are completely separated from the main temperature control system.

The thermostat settings are automatically calculated from the set temperature and the high/low limits entered in the display **page 07**, and are updated each time a new temperature set is made active or if the High/Low limits has been changed.

If the main controller should happen to fail, the settings will be left unchanged and the heater/light, alternatively the cooling machine, will be disconnected if the temperature drifts outside the limits.

If one of the safety thermostats is activated, a red warning lamp will be lit in the front panel, a message will be given in the display and a acoustic signal will sound (if enabled in Page 14). It can be turned off with the **Enter** button

Example:

07	Safety Limits
Low -5.0	High 4.0 °C

02	Settings:
100%Light	20.0 °C

High safety thermostat is activated at temperatures above 20+4=24°C
 Low safety thermostat is activated at temperatures below 20-5=15°C

As soon as the temperature comes inside the limits again, all warnings will be turned off and the heater/cooling machine will be reconnected.

In order to prevent out of safety conditions during a temperature change, up or down, only the upper or the lower thermostat setting is updated respectively. When reaching the new temperature, both the upper and lower safety setting is updated again. This can be seen as a short flash in the warning lamp. The lights will also be turned off for a few seconds.

Temperature Alarm (Display page 08)

In order to give an early warning if the temperature should happen to drift away from the set temperature, an alarm system with adjustable limits is available.

If the upper or lower limit is exceeded, a flashing message will be given in the display, and an acoustic signal will sound (if enabled in page 14).

Example:		High alarm at temperatures above 20+3 = 23°C Low alarm at temperatures below 20-3 = 17°C
08	Temp Alarm Limits	
Low -3.0	High 3.0 °C	
02	Settings:	
100%Light	20.0 °C	

No alarms will be given during a temperature change or if the cabinet is shut down after a timer timeout.

The visual alarm appears immediately when an alarm situation begins, while the acoustic alarm is delayed for 30 seconds.

The acoustic alarm can be turned off with the **Enter** button. It will remain off until a new alarm condition occurs. The visual alarm will remain visible until the alarm condition ends.

The alarm limits should always be less than the Safety limits (Display page 07)

LIGHT CONTROL

The light tubes are placed in hinged “doors” on each side of the cabinet. The lamps are fully electronic controlled.

The main advantage of this electronic system is the ability of dimming. Besides, the lifetime of the tubes is longer, the energy consumption is lower and there is no flashing when turning on the lights. Bad tubes will automatically be cut off.

How to enter a new light setting

- Go to **Page 02**, by using the **Up/Dn** buttons -
- Hit the **Right** button one time, the %L turns flashing -
- Load the new set value by using the **Up/Down** buttons.
-
- Hit the **Enter** button

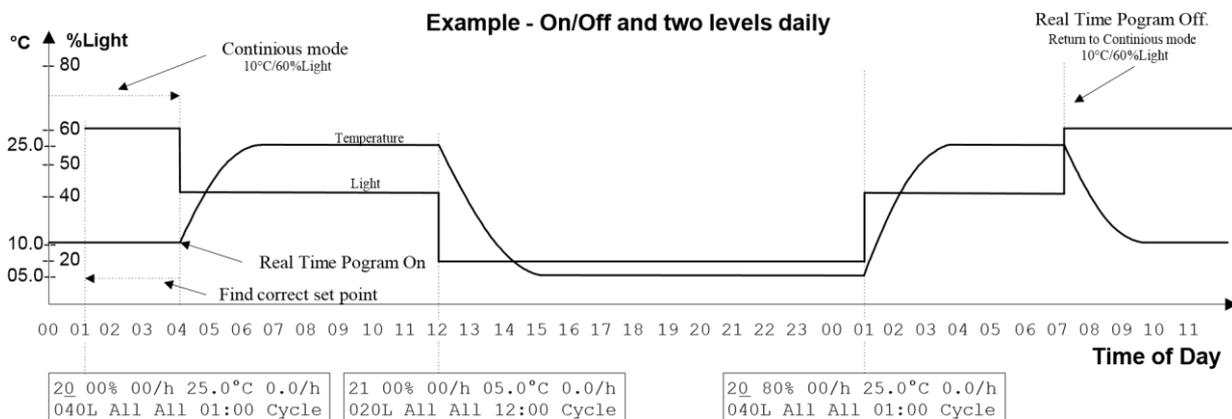
Limitations

- The temperature control system has priority over the light control. When working at a low temperature with much of the light on, the cooling capacity may be exceeded. Therefore, the amount of light will automatically be reduced in order to keep the temperature on target. The real light output can be read on **display page 1** □ Also, much light at low temperatures increases the risk of ice-buildup. See the **Temperature Control** Chapter. The light setting range is 0 – 100 %. However, it is not possible to lit the lamps at one and two %. Therefore, those settings results in the same amount of light as 03 %.
- During the de-ice cycle, the light is turned completely off. See **Page 10 – De-ice Settings**.
- When a new temperature is set, the light will be turned off for a few seconds when the temperature is reached the very first time.
- The light is turned off if High Temp Safety limit is exceeded. See the **Temperature Control** Chapter.

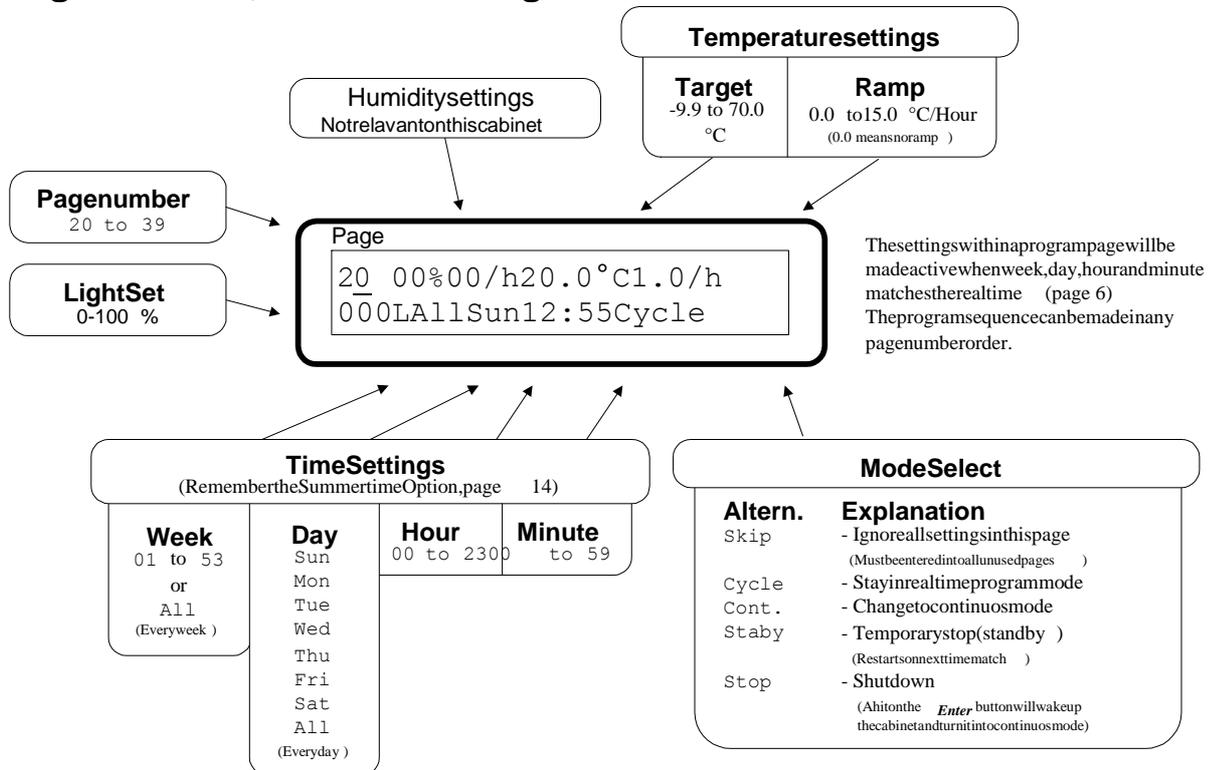
REAL TIME PROGRAM

This function is normally implemented as standard in a climatic cabinet, but may have been taken out when ordering. If a star is present behind **RealProg** in the display **page 14**, this option is available for permanent use.

However, the function is always residing in the system and can be tested for up to 30 days (display **page 14**). A unique code can be ordered from Termaks and loaded into the system (display **page 13**) in order to implement this option for permanent use. The temperature set displayed in **page 2** is the actual set for the time being and can not be changed by the buttons.



Pages 20 – 39, Real Time Program



How to make a program

Twenty equal display **pages, 20 to 39**, are available for entering a program. Each page represents a program event such as a new temperature set, ramp rate or a change of the cabinet mode. The moment for activating the changes must also be loaded in each of those pages. When the moment entered in a page matches the real time (display **page 06**), the settings in that particular page are made active. The program events can be loaded in any order of those 20 pages. All unused pages must be set to Skip in order to prevent accidental changes.

When the program is turned on, the system looks back in time in order to find the correct settings for the time being. Therefore, the function may be turned on or off at any time during a cycle. This way of starting must be taken into consideration when making a program.

Since week number and name of day are available, it is possible to make a lot of combinations. Multiple changes can be done daily, others only on a specific day of week and even on a specific day in a specific week. The examples below should clearly indicate the way of building a program.

How to turn On/Off

The program can be turned on or off in the display **page 06**, Real Time

When this function is turned on, the message Prog.Mode will appear in display **page 01**.

When turning the function off, the temperature set will return to the set value in display **page 02**

Ramping

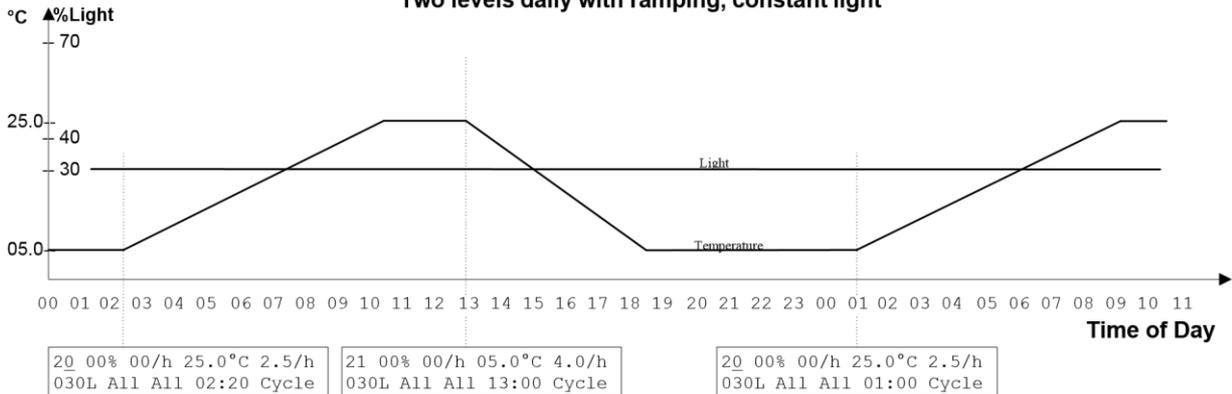
In order to make it possible to change the temperature in a specified change rate, up or down, a ramp feature is available. At every program event, display **pages 20 to 39**, the ramp rates can be defined. A ramp rate set to zero, means no ramping. During a ramping period, the message **Ramping** is displayed and the set values is displayed in the display **page 2**. The set values changes in steps of 0,1°C. If a power failure should occur during a ramp period, the ramping will restart from the actual temperature in the cabinet at the moment of power return.

The temperature ramp rate is defined as °C/hour. At fast changing rates, the heater or cooling capacity for a particular cabinet may be the limiting factor.

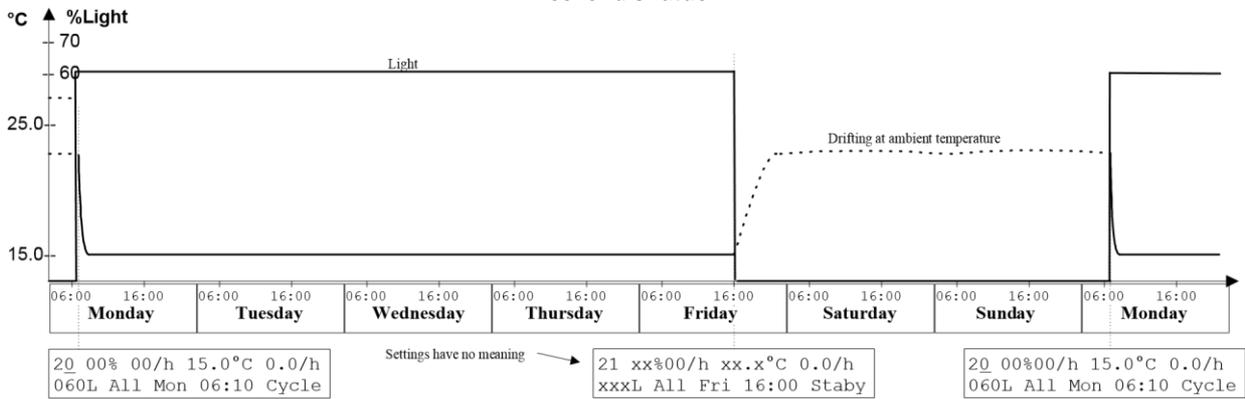


More Examples - Real Time Program

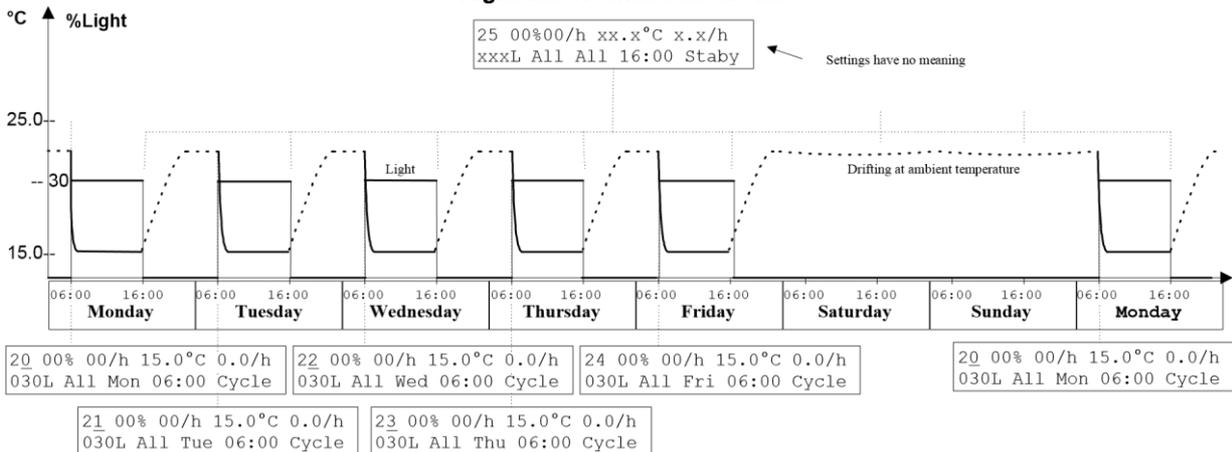
Two levels daily with ramping, constant light



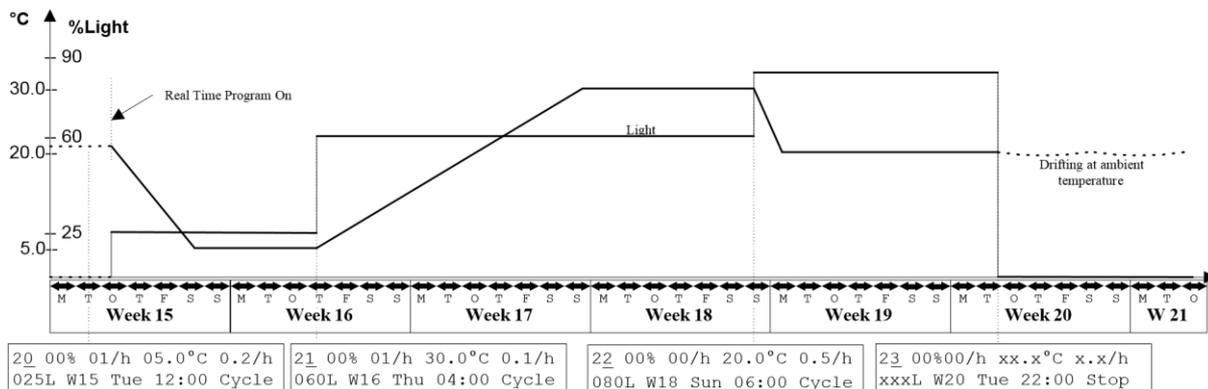
Weekend shutdown



Night and Weekend shutdown



Several weeks cycle



PRINTER REPORT (OPTIONAL)

Printrate
1 to 60 minutes
Date, time and temperature will be printed in the entered rate
0 means no such printing

Page

```
12 PrintRate10Min
EventPrinting On
```

Eventprinting On/Off
Important events, such as alarms and new settings can be printed on the operator's choice, On or Off

This is not a standard function, but may have been implemented when ordering the cabinet. If a star is present behind Printer in the display **page 14**, this option is available for permanent use.

However, the Printer Report System is residing in the system and can be tested for up to 30 days (display page 14). A unique code can be ordered from Termaks and loaded into the system (display **page 13**) in order to implement this. The system is designed for printing on a Seiko Thermal printer DPU-414. If bought from Termaks, the printer will be configured and ready for use.

Other printers with serial interface, RS-232C, H/W BUSY, XON/XOFF, may be used.

A connection to a PC is also possible. A standard Windows program, "HyperTerminal" can be used to display the report.

Each printout represents the average temperature during the last minute prior to the printing and starts with date and time.

Example: 2004 Feb13 1455 37.0°C 75%Light

Events printout summary

System Reset

Temperature Set: 05.0 °C

Light Set: 75%

Cycle Completed, Shutdown

Restart from Shutdown

Door Open

High Temperature Alarm

Low Temperature Alarm

Temperature Alarm Off

Temperature Safety High

Temperature Safety Low

Temperature Safety Off

Glycol Level Low

Alarm Acknowledge

De-ice Start

Summertime Start

Summertime End

Description

When powering up the cabinet or after a power failure

Set point 5.0°C has been made active, either manually in display page 2 or by the Real Time Program. In Ramping mode, the final temperature set is printed

Set point 75% has been made active, either manually in display page 2 or by the Real Time Program

A temperature cycle is completed and the cabinet is turned off

The cabinet is restarted with the **Enter** button

The door has been opened. (A significant temperature change has been recognized)

The temperature has exceeded the upper alarm limit

The temperature has dropped below the lower alarm limit

A high or low alarm situation has ended

The temperature has exceeded the upper safety thermostat limit

The temperature has exceeded the lower safety thermostat limit

A high or low safety situation has ended

The glycol level is low and need to be filled

An acoustic alarm has been turned of by the **Enter** button

A de-ice cycle of the cooler has started

The real time has changed from normal to European daylight saving time

The real time has changed from European daylight saving time to normal time

- Real Time Program On** The Real Time Program has been turned on
- Real Time Program Off** The Real Time Program has been turned off
- Real Time Program Event** New settings and status due to a Real Time Program event
- Temp. Ramp Rate 1,0°C/h** A temperature ramping has started with the rate 1,0°C/hour. (Example)
- Standby Mode** Cabinet temporarily turned off. Waiting for restart on next program event

Remote Operation

Available only on program releases 0504 or higher.

When a PC is used instead of a printer, it is possible to do some basic settings via the PC's keyboard. In addition, the actual temperature, humidity and light can be monitored on the screen. This can be a useful feature if the cabinet is placed in a clean room. The cabinet can be operated without entering the room.

The system responds to the keyboard operations (**Capital letters only**) as follows:

Note: In Real Time Program mode, the system will respond on D and A

T (Temperature)

The actual temperature set is displayed, followed by the question **New?** If desired, a new set value can be written.

Example: **Temperature Set: 20°C New? 37.0 (eventually 04.0 or -1.5)**

The new set value is made active by a hit on the **Enter** key. If a valid value has been entered, it will be repeated on the screen, otherwise the message **Invalid** will appear.

The safety thermostats will automatically be adjusted for the new setting

L (Light)

The actual light set is displayed, followed by the question **New?** If desired, a new set value can be written.

Example: **Light Set: 55 % New? 50 (eventually 05 or 100)**

The new set value is made active by a hit on the **Enter** key. If a valid value has been entered, it will be repeated on the screen, otherwise the message **Invalid** will appear.

D (Display)

The actual Temperature and Light can be monitored continuously on the screen. The function can be toggled **On/Off** with this key.

Example: **20.1°C 80% Light**

A (Acknowledge)

The acoustic alarm can be turned off by a hit on this key

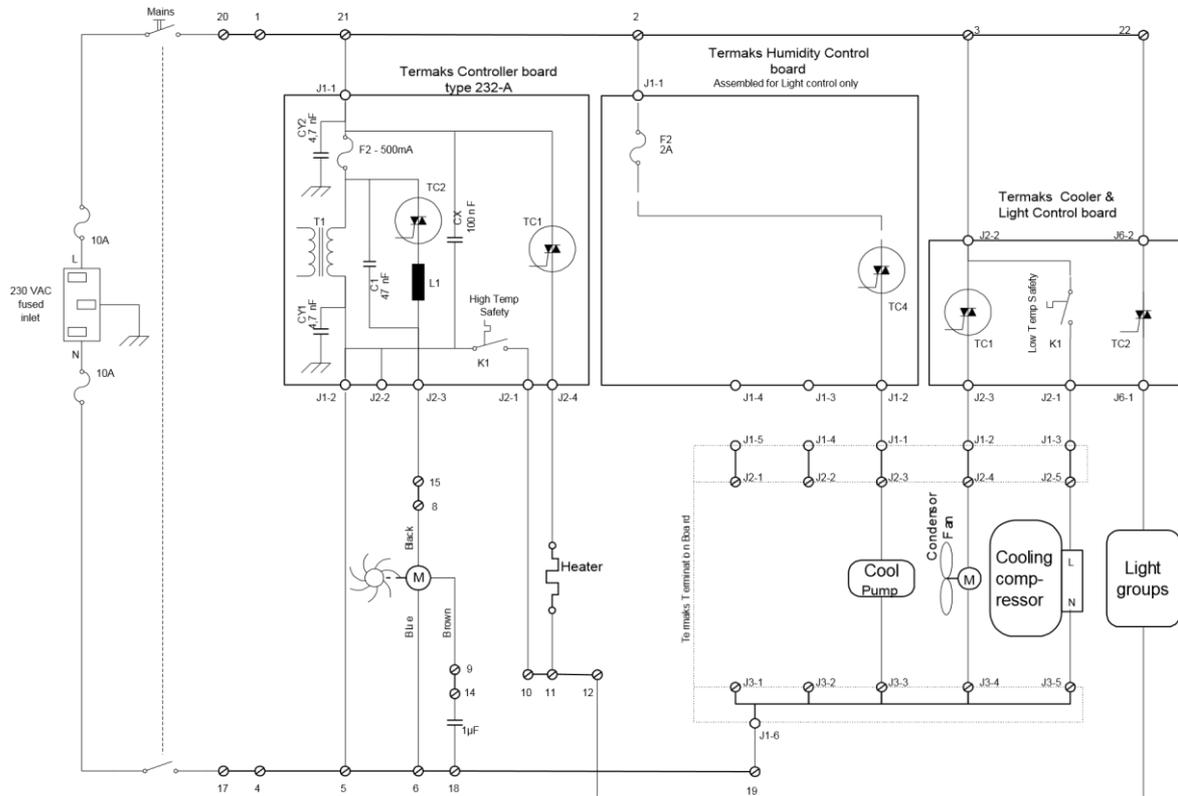
TROUBLESHOOTING

Symptom	What to check
No light in the power switch	Fuses in the power inlet (10A)
Dead display	Fuse F2 on the controller board (500mA)
Periodic High Safety alarm	Realistic high safety limit in display page 07

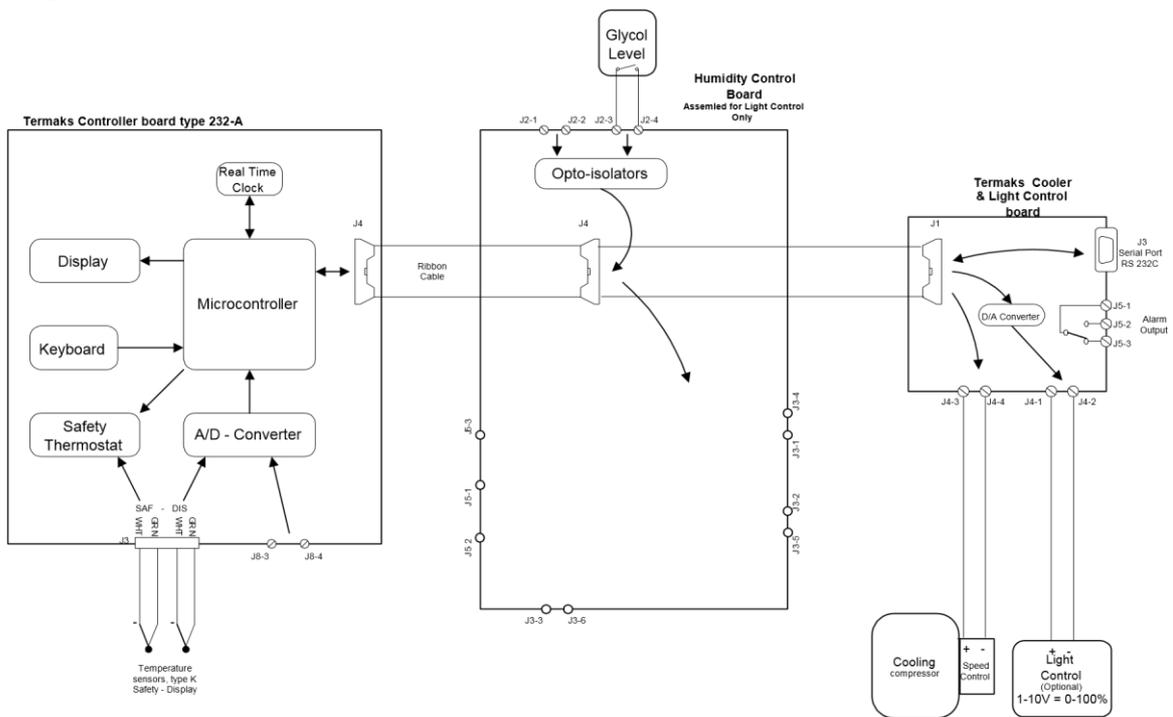
	Does the heater turn on/off according to the output indication? Display page 15 At working temperature below the room temperature, do the Weak or no cooling checks as well
Periodic Low Safety alarm	Realistic low safety limit in display page 07 Does the cooler pump turn off according to the output indication? Display page 15
Weak or no cooling	Are the compressor and the cooler pump running according to the output indicator? Display page 15 ? Dust buildup on the condenser? Eventually, clean it! Does the condenser fan work properly? Does the internal fan work properly?
Unstable temperature	Does the internal fan work properly?
Missing functions	Correct option setup? Display page 14
Unknown or missing display pages	Correct cabinet type selected? Display page 14

SIMPLIFIED CONNECTOR DRAWINGS

AC Connections



Low voltage Connections



SPAREPARTSLIST

Ordering no.	Description		
		10067	Power switch
		10068	Power cord with plug
10814	Cooling compressor Danfoss TLV 7F	10066	IEC power inlet module
50815	Condenser complete with motor	10071	Fuse 10A for IEC power inlet module
10804	Fan motor for condenser	46801	Silicone door gasket
5102-F	Evaporator finned tube	520-F	Door locker complete
4203-F	Temperature sensor	50813	Wheel, lockable
40033	Controller Type RS232 *	40026	Bearing for door, upper hinge
4	Humidity & Control board, Assembled for Light	47004	Bearing for door, lower hinge
40042	Cool & Light Control Board	4209-F	Shelves with bearings
40040	Ribbon cable	4204-F	Door, solid
10808	Magnetic pump	5107-F	Door with glass window and cover
46803	Fan motor, air circulation	14802	36 W tubular light, white
18003	Capacitor for fan motor, 1 μ F	10816	Electronic reactor, dimmable
16706	Liquid level switch	10817	Lamp-holder
46805	Heating element 600 W	46816	Triple glass 510 x 1000 m/m

* Serial number of the controller to be replaced is required (label on the board or display page 13)