SO-LOW
ENVIRONMENTAL EQUIPMENT COMPANY

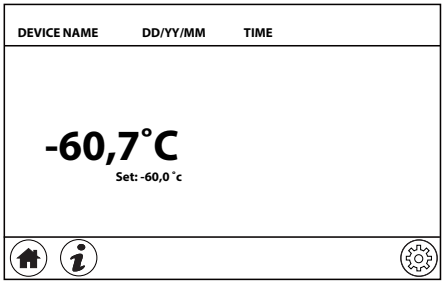
EN
FR

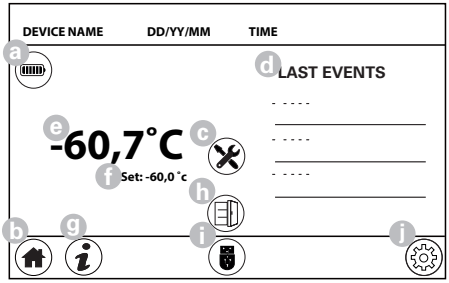
BIOMEDICAL DISPLAY

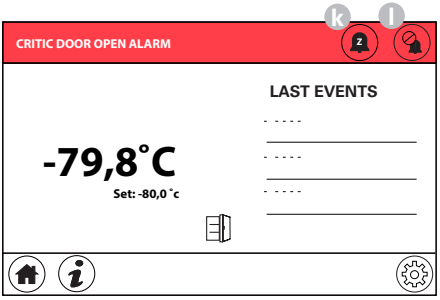
BIOMEDICAL SOLUTIONS

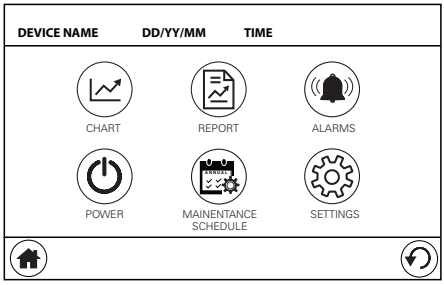
USER INTERFACE GUIDE
GUIDE DE L'INTERFACE UTILISATEUR

CONTENTS









MAIN PAGE

Under normal conditions of use, the main screen of the display is as follows:

The description of the symbols on the main page is as follows:

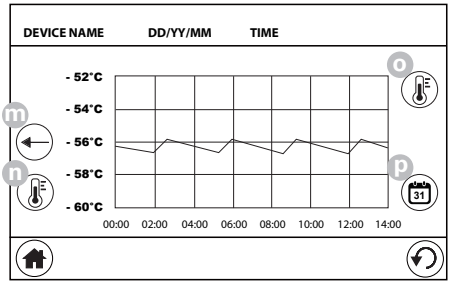
a. Status of battery charge
b. Home button
c. Maintenance task expired
d. Last event section
e. Main probe temperature
f. Set point
g. Info page button
h. Status of the door
i. USB drive inserted
j. Menu key
k. Snooze Alarm
l. Silence Alarm

In the event that an alarm occurs, from any screen you are on, the interface returns to the main page with the relative alarm signal in the upper bar of the screen.
In this phase, the acoustic signal can be silenced for a period (k /"snooze" button) or permanently silenced (l /"Silence" button):

If more than one alarm is present at the same time, all the alarms present alternately will be displayed in the upper red bar.

MAIN MENU

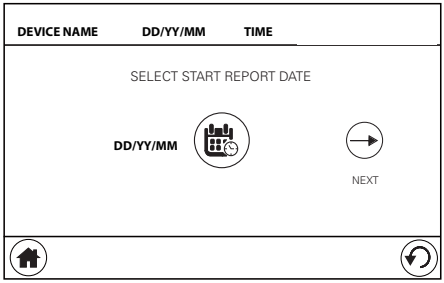
By pressing the menu key it is possible to access the main menu:



Chart

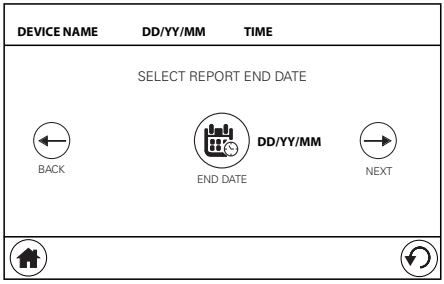
On the settings page, by pressing the "CHARTS" key you can access the page for displaying the temperature graph:.

m. Part of the day selector button
n. Probe selection
o. 24H view button
p. Day to graph selector button



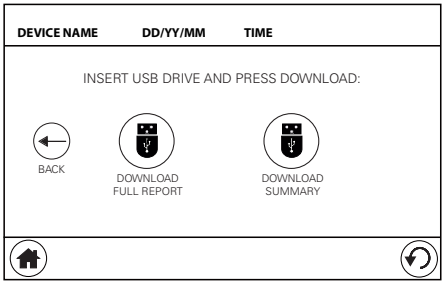
Report

On main menu page, by pressing the "REPORT" key you can access the page that allows you to export the report to USB drive. Select the starting date (oldest) of the report you want to export:



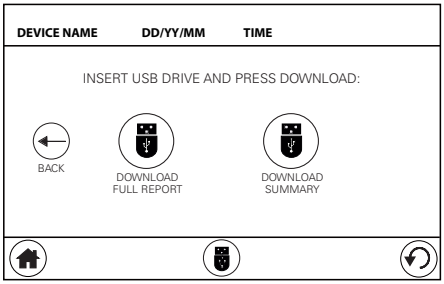
Select the (most recent) end date of the report you want to export:

Finally, on the page it is possible to select the type of Report to be exported



Download

Insert a pen drive on the front door of the device and wait for the symbol to appear at the bottom of the screen. At this point it is possible to select one of the 2 forms of report

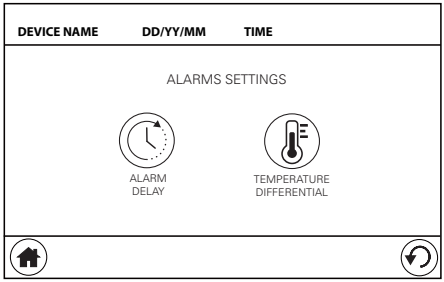


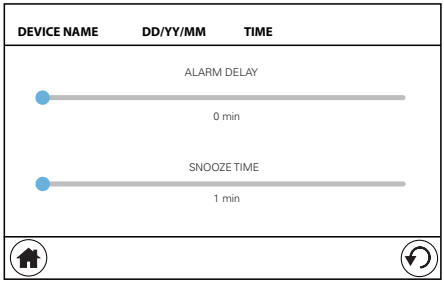
- FULL REPORT: exports a report of the temperature data of the various probes with one sample per minute. This selection may take longer time to download

-SUMMARY: exports a report of the data in a synthetic way (the sampling depends on the chosen time period). This selection allows you to download the data faster.
See section: "REPORT FILE AND CHART MANAGEMENT"

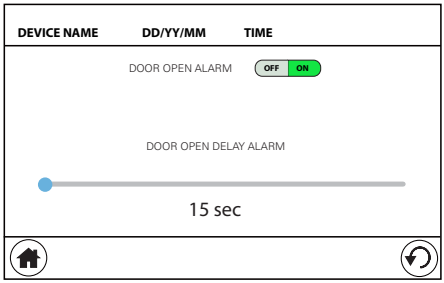
Alarm settings

On the main menu page, by pressing the "ALARMS" key it is possible to access the alarm settings page:

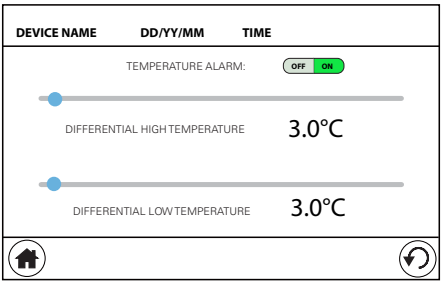




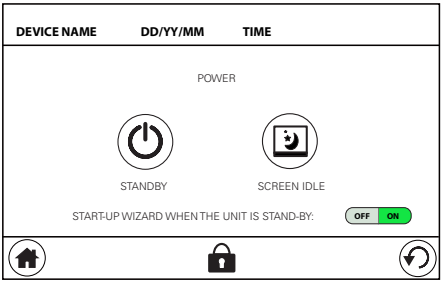
Where it is possible by accessing "ALARM DELAY" to access the settings page of the alarm signal delay and snooze time (silencing time of the acoustic signal when, in the presence of an alarm, the snooze button is selected):



Door open delay can be adjusted from same menu

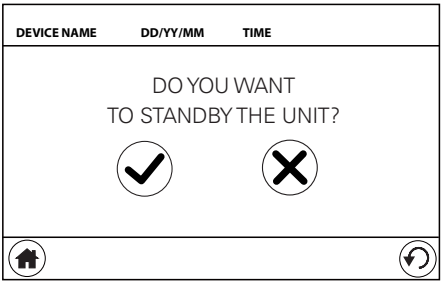


If entering "TEMPERATURE DIFFERENTIAL" it is possible to adjust the temperature differential when alarms are generated.
In this section you can set the high and the low temperature differential.



Power

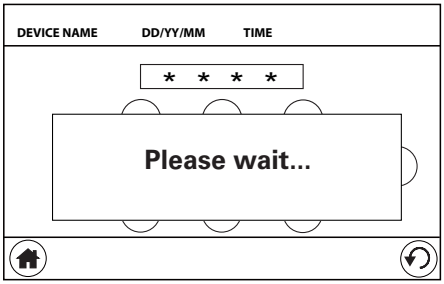
On the main menu page, by pressing the "POWER" button it is possible to activate the STANDBY mode of the appliance or activate the screensaver on the screen:



STANDBY

In order to activate the STANDBY mode it is necessary to enter the service code.

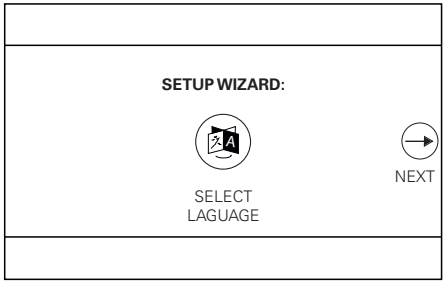
When setting unit to "Standby" mode it is important to follow this procedure completely to ensure, that unit keeps a low battery use during standby.



Unit can be set to standby both with and without “Start-up Wizard” turned on.

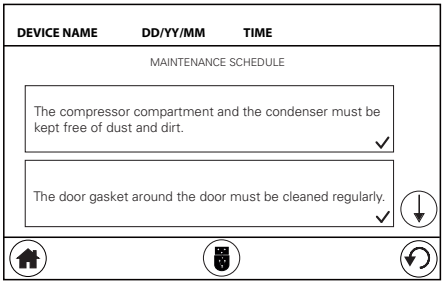
In the example shown left, the “Start-up Wizard” is activated.

If unit runs on battery power, display panel is indicating this with an acoustic signal



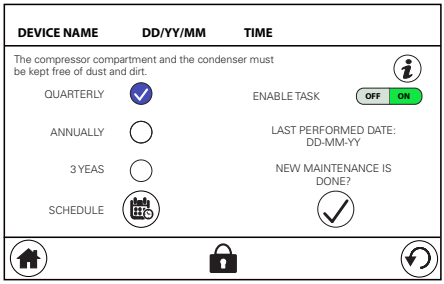
NOTE:
The power supply must be on until the last screen (see left)

Then mains power can be disconnected.

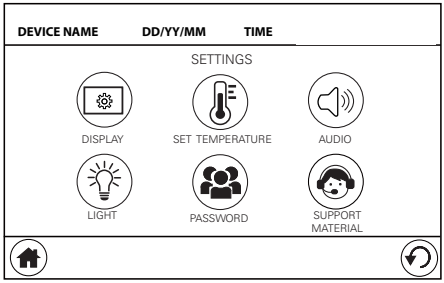


Maintenance schedule

On the main menu page, by pressing the “MAINTENANCE SCHEDULE” button you can access the settings page of the scheduled maintenance activities of the appliance:

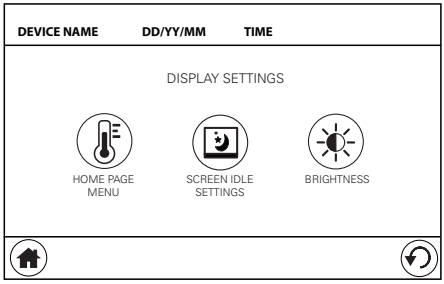


By selecting one of the activities in the list it is possible to access the detail page of its programming:
Where you can select the periodicity of the activity or the specific day.
On this screen, you can also view the date of the last maintenance performed and select whether a new maintenance has been performed.
By pressing the "i" key, you can view the details of the operations planned for the selected maintenance activity.



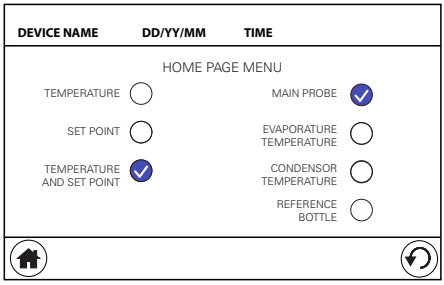
SETTINGS PAGE 1

On the main menu page, by pressing the "SETTINGS" button you can access the appliance settings page:



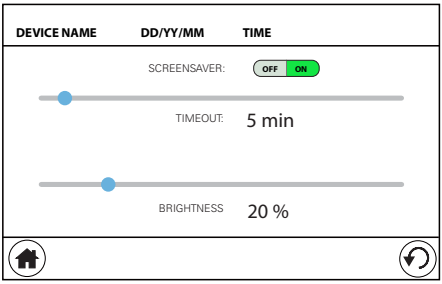
Display

By selecting the "DISPLAY" menu you access the display settings page:

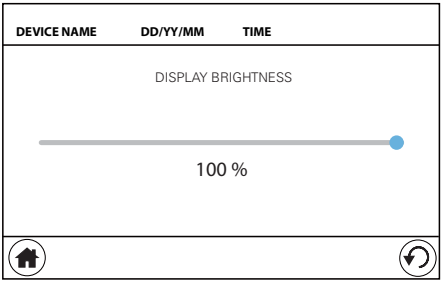


where you can set (HOME PAGE MENU):

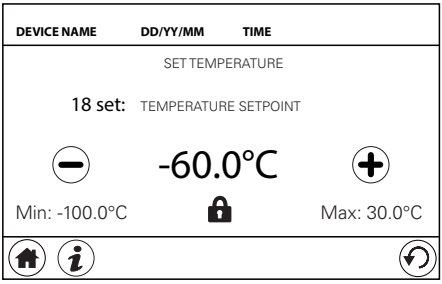
- the elements you want to be displayed on the Home Page:



- The settings related to the screensaver (SCREEN IDLE SETTINGS):



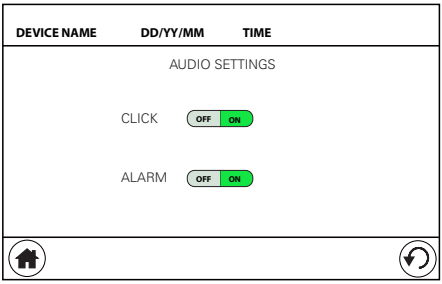
- The brightness of the display (BRIGHTNESS):



Set temperature

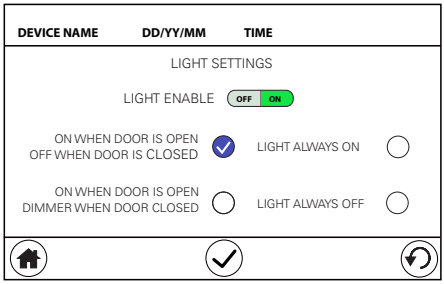
On the settings page, by pressing the "SET TEMPERATURE" key it is possible to set the appliance set point temperature page:

If there is a lock icon at the bottom of the page, to set a new set point temperature, the service code must be entered.



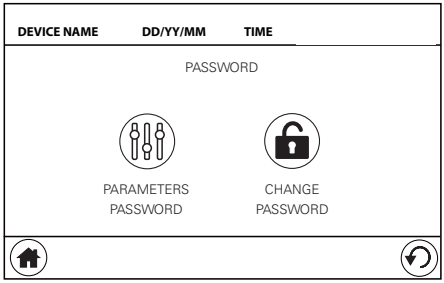
Audio

On the settings page, by pressing the "AUDIO" key it is possible to access the audio setting page of the appliance (enabling audio on a "click" tone when touched on the screen and enabling the acoustic signal in the event of an alarm):



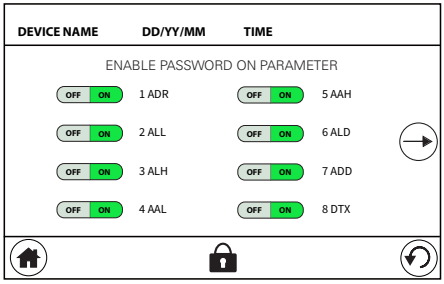
Light

On the settings page, by pressing the "LIGHT" button you can access the appliance light setting page:

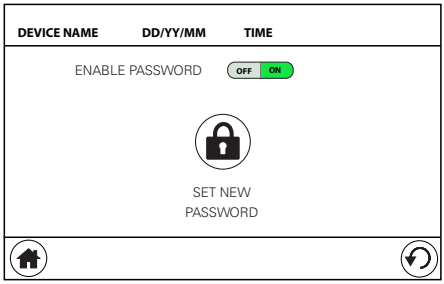


Password

On the settings page, by pressing the "PASSWORD" button you can access the page for setting the service password and enabling the password in the parameters:



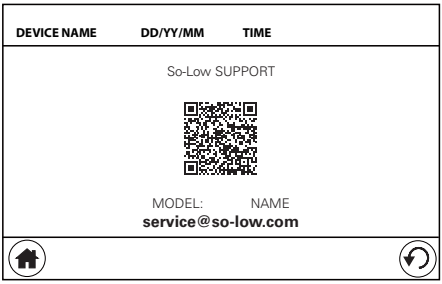
By accessing the parameter password page, it is possible to select on which parameters the service code is enabled for modification (on) and on which parameters the modification will not ask for the service code (off):



by accessing the service password change menu page instead:

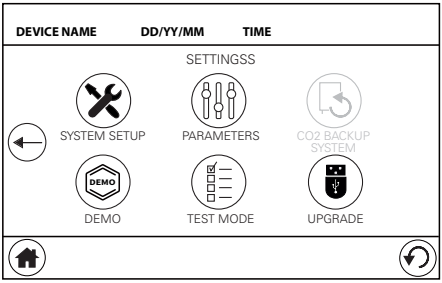
It is possible to enable or disable this code or to change the code in use. These operations require the insertion of the service code.

The default value of the service code is 1234.



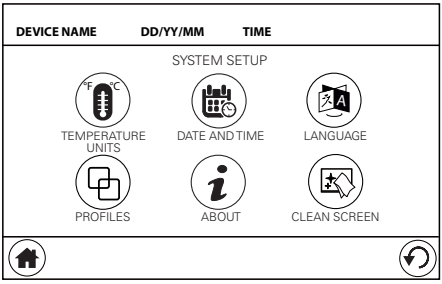
Support material

On the settings page, by pressing the "SUPPORT MATERIAL" button you can access the page where you can find the references for the product manual, the start guide and technical support (QR code and email):



SETTINGS PAGE 2

On the settings page, pressing the right arrow takes you to the second settings page:



System setup

On the second settings page, by pressing the "SYSTEM SETUP" key it is possible to access the appliance setup page:

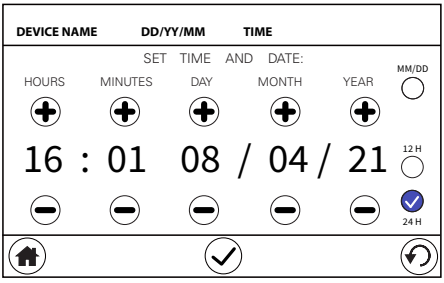
On the System Setup Page, you can set:

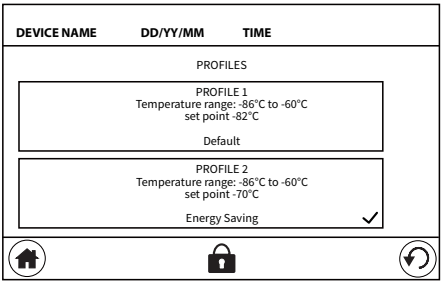
- The unit of measurement of the appliance temperature

- The date and time of the appliance:

On this page you can select the 12 or 24 H clock display and if you prefer the day / month / year or month / day / year display on the calendar date.

- The language of the user interface
- Your preferred temperature profile

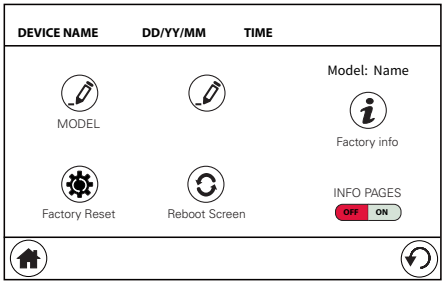




Temperature profiles

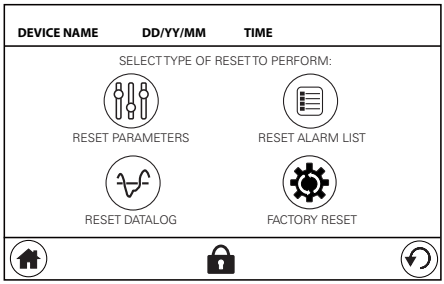
The controller is pre-programmed with profiles for quick setup

Pre-programmed Ultra low profiles available forMV85-1, MV85-2, MV85-3



Appliance info page

Here the model, serial number and software version of the board are displayed.
In this page it is also possible to change the name of the appliance, and the name of the lab where the appliance is placed.
By disabling the info pages, the numbers of the bottom page and the info pages (where present) will no longer be visible.



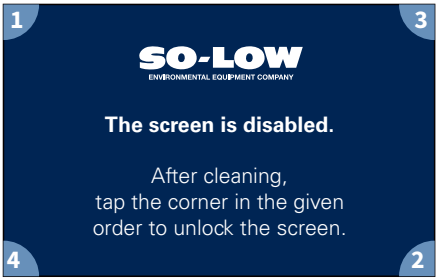
Factory Reset

By pressing the "Factory Reset" key you access the menu page that allows you to reset the appliance:

On this page you can select the following types of reset:

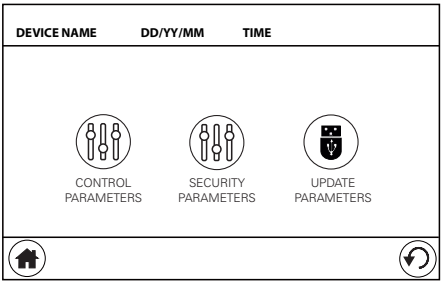
- PARAMETER RESET: performs a default setting of the system parameters
- RESET ALARM LIST: deletes the list of system alarms
- RESET DATALOG: deletes the historical data present
- FACTORY RESET: performs a default reset of all appliance parameters (including historical data and alarms)

In order to perform one of these resets, the service code must be entered. PPlease note service code will not be reset during factory reset.



Clean screen

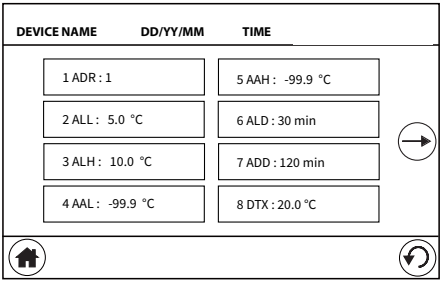
Selecting the "CLEAN SCREEN" page you access the screen that allows you to clean the screen (with a soft cloth and suitable products) before returning to the normal functionality of the user interface:



System parameters

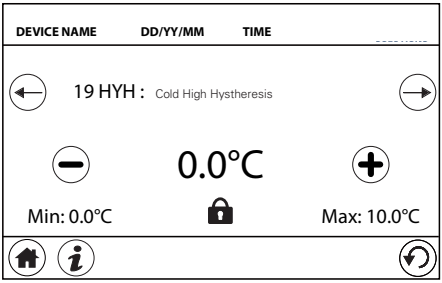
On the second settings page, by pressing the "PARAMETERS" key it is possible to access the parameter setting page:

On this page you can select the type of parameter you want to set (control or safety) and you can access page with the list of related parameters:

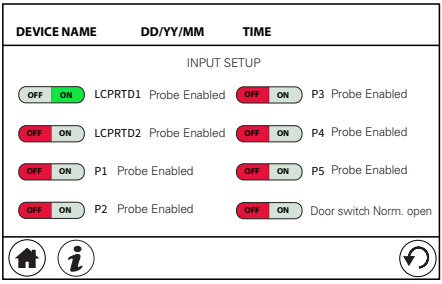


From the parameter list page, by selecting one, you access the detail page of that parameter, where you can change the value.

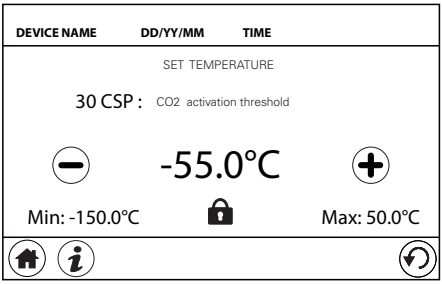
If there is a lock icon at the bottom it means that in order to change the value it is necessary to enter the service code.

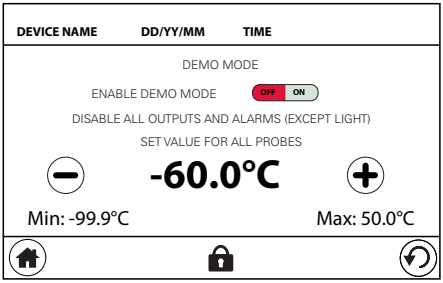


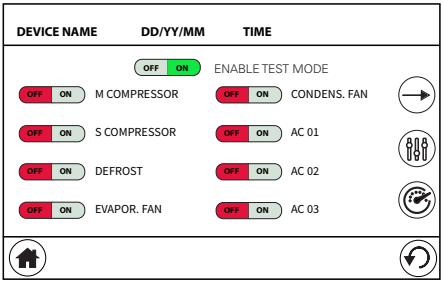
Some parameters, called "superparameters", consist of a list of flags to be enabled or disabled:

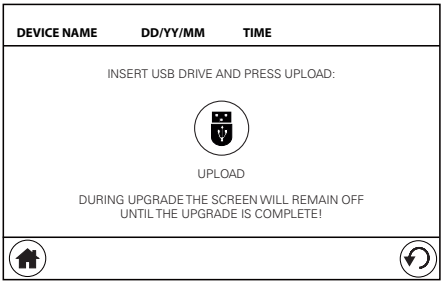


Also for these parameters, if there is a lock icon at the bottom to be able to change the value, the service code must be entered.
For a description of the individual parameters, see the chapter on system parameters.
On the parameter type selection page, by pressing the "UPDATE PARAMETERS" key it is possible to load the parameters and thermal profiles from the USB pen drive.









Co2 Backup

On the second settings page, by pressing the “CO2 BACKUP SYSTEM” button you can access the page for setting the temperature threshold for CO2 activation.

Demo mode

On the second settings page, by pressing the “DEMO” key it is possible to access the DEMO mode settings page:

In this mode all alarms are disabled and temperature regulation is disabled. A “virtual” temperature is also set for all probes. The “virtual” temperature can be selected by pressing the “+” or “-” keys.
This mode can be enabled by entering the service code.

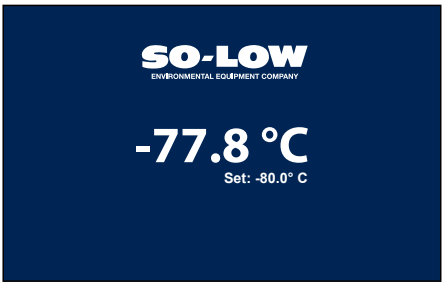
Test mode

On the second settings page, by pressing the “TEST MODE” key it is possible to access the setting page of the TEST mode:

This mode can be enabled by entering the service code.
In this mode it is possible to test the individual appliance outputs and monitor the values in the dashboard by pressing the button

Upload

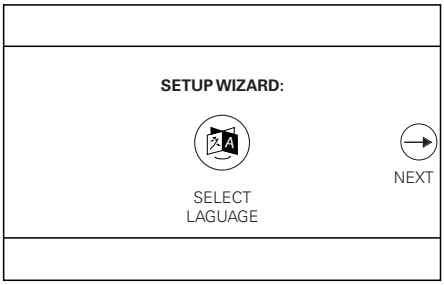
On the second settings page, by pressing the “UPLOAD” button it is possible to update the software version:
This function can be used by entering the service code.
Insert a pen drive with the update files and press the “UPLOAD” button. (Request the update files by contacting So-Low support)
During the update, the display will remain off and during the update an alternating beep will be emitted until the update is complete. This update phase takes about one minute.



Screensaver

After a period of inactivity, if the screensaver is enabled, the screensaver screen will be displayed with the temperature read, the set point and the temperature graph of the last hours:

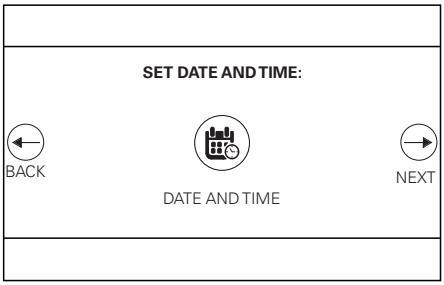
At the first touch on the screen, the interface will display the main screen.



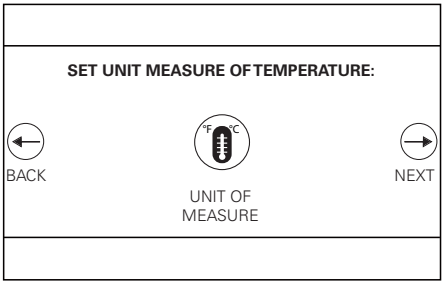
WIZARD

When the device is first started, or after performing a reset with default values, a configuration wizard is displayed. Through a few settings it allows you to commission the fridge with the minimum settings for its operation. At this stage it is sufficient to select:

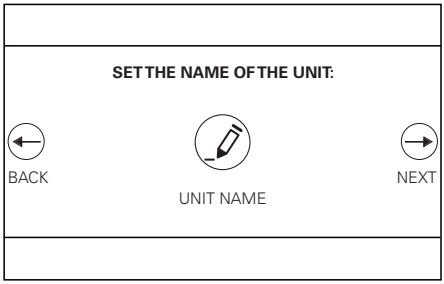
- the interface language



- the date and time

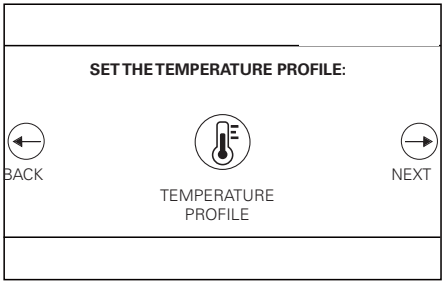


- temperature unit of measurement

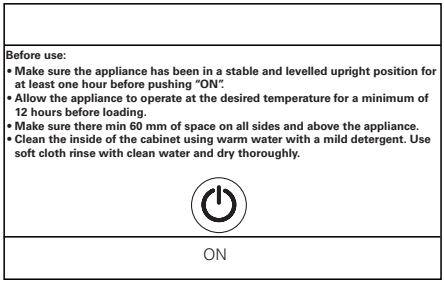


- device name

- service code



- selection of the desired temperature profile



- recommendations for use and installation and choice to activate the unit.

Field	Format/ Resolution
Date and hour	DD/MM/YY HH:MM
Main probe temp.	0,1°C
Set point	0,1°C
Evaporator Temp. (P1)	1°C
Condensor Temp. (P2)	1°C
P3 probe	1°C
Reference Bottle 1 (P6)	0,1°C
Reference Bottle 2 (P7)	0,1°C
Door State	OPEN or CLOSE
Alarm Flag 1	0-255
Alarm Flag 2	0-255
Main Current(mA)	mA
Mains Voltage(V)	Vac
P8 probe Temp.	0,1°C
P9 probe Temp.	0,1°C

Report.csv

REPORT FILE AND CHART MANAGEMENT

The fields in the "Report.csv" (Full Report) file are the following (if the data is valid):

The maximum log file size that can be requested is 30 days in a single file.

The requested period can be prior to the current date by at most 10 months (if the controller board has been on for a longer time).

The "summary" version exports to the "Report Summary" file. csv a sample (row) every:

- 15 minutes for a period of less than (or equal to) 1 day
- 30 minutes for a period of less than (or equal to) 3 days
- 60 minutes for a period of less than (or equal to) 7 days
- 240 minutes for a period longer than 7 days

The "Full Report" version exports a sample every minute to the "Report.csv" file
If the requested period is prior to the time the unit is switched on, a period of time will be returned starting from the first switch on.

Byte	Name	Bit	Description
	LCP Ala-Fault1	0	HT PreAlarm
		1	HT Alarm
		2	LT PreAlarm
		3	LT Alarm
		4	BlackOut Alarm
		5	Door Status
		6	Critic Door
		7	Reserved

Bits in LCP Alarms 1

"Alarm Flag 1" and "Alarm Flag 2" are a bit field byte with the following bits structure:

Byte	Name	Bit	Description
	LCP Alarm 2	0	High Temp Condensor
		1	Dirty Condensor
		2	Low temp Evaporator
		3	Time-out Defrost
		4	CPH Compressor Time
		5	Probe Fault
		6	Pressostat
		7	Black-out Fault

Bits in LCP Alarms 2

Field	Format/ Resolution
Date and hour	DD/MM/YY HH:MM
Main probe temp. (max)	0,1°C
Main probe temp. (min)	0,1°C
Set Point	0,1°C
Evaporator Temp. (P1) (min)	1°C
Evaporator Temp. (P1) (max)	1°C
Condensor Temp. (P2) (max)	1°C
Condensor Temp. (P2) (min)	1°C
P3 probe (max)	1°C
P3 probe (min)	1°C
Reference Bottle 1 (P6) (max)	1°C
Reference Bottle 1 (P6) (max)	1°C
Reference Bottle 2 (P7) (max)	1°C
Reference Bottle 2 (P7) (min)	1°C
Door State	OPEN or CLOSE
Alarm Flag 1	0-255
Alarm Flag 2	0-255
Alarm Flag 3	0-255

Report_summary.csv

The fields in the " Report_summary.csv " (Summary) file are the following (if the data is valid):

Byte	Name	Bit	Description
	LCS Alarm	0	SF PreAlarm
		1	SF Alarm
		2	SC PreAlarm
		3	SC Alarm
		4	Reserved
		5	Reserved
		6	Reserved
		7	Probe Fault

Bits in LCS Alarms

"Alarm Flag 1" and "Alarm Flag 2" are a bit field byte with the same structure of "Report. csv" file.

"Alarm Flag 3" is a bit field byte with the following bits structure (of LCS Alarm):

The data reading time for Report files (Full or Summary) depends on the time period required. Background reading of the last month's data is under development (for next sw version) so that data will be available for download very quickly. In this next sw version, if a period of time more than one month is requested, it will be necessary to wait for the data reading time (as in the current sw version).

On the "chart" page, the graph will not be available if less than 24 hours have passed since the first power up of the Controller board.
If probes P6 and P7 (reference bottle probe 1 and 2) have been enabled, these 2 probes can also be displayed in the graph.

FAULTS AND ALARMS

TITLE ON UPPER BAR ON UI	DESCRIPTION	Notes
CONTROL ALARMS LIST		
HIGH TEMPERATURE PRE ALARM	Main probe high temp. pre-alarm	See ALD Control param
HIGH TEMPERATURE ALARM	Main probe high temp alarm	AAH (Absolute Alarm High temperature) parameter defines the temperature alarm limit. High temperature limit: the high temperature limit used by the controller is the minimum value between (SETPOINT + ALH) and (AAH
LOW TEMPERATURE PRE ALARM	Main probe low temp. pre-alarm	See ALD Control param
LOW TEMPERATURE ALARM	Main probe low temp alarm	AAL (Absolute Alarm Low temperature) parameter defines the temperature alarm limit. Low temperature limit: the low temperature limit used by the controller is the maximum value between (SETPOINT - ALL) and (AAL)
HIGH TEMP BLACK-OUT ALARM	Main probe high temp. alarm after black-out	See ADD Control Param
CRITIC DOOR OPEN ALARM	Critical door open alarm	See DOO Control param
DTX COMMUNICATION ALARM	Main and secondary probe temperatures difference is too high (greater than DTX value for DTD minutes)	See DTX and DTD Control Params
SECURITY ALARMS LIST		
SECURITY COLD PRE ALARM	Security main probe cold pre-alarm (in the cell)	See PCD Security Param (“LCS Security Control” document)
SECURITY COLD ALARM	Security main probe cold alarm (in the cell)	See PCT Security Param (Cold protection intervention threshold, Low Temperature Limit) for a time greater than PCD seconds (“LCS Security Control” document)
SECURITY HOT PRE ALARM	Security main probe hot pre-alarm (during defrost)	See PHD Security Param (“LCS Security Control” document)
SECURITY HOT ALARM	Security main probe hot alarm (during defrost)	See PHT Security Param (Hot protection intervention threshold, Low Temperature Limit) for a time greater than PHD seconds (“LCS Security Control” document)

CONTROL FAULTS LIST		
CONDENSER HIGH TEMPERATURE	High temperature of the condenser	If the temperature detected by the condenser probe is greater than or equal to the value of the MCT parameter (0°C / +60°C) for at least 10"
DIRTY CONDENSER	Dirty on condenser fault	See PTD parameter
LOW TEMPERATURE EVAPORATOR	Low temperature of the evaporator	If an evaporator temperature lower than LET ° C is detected for at least 10" with the door closed
DEFROST TIME OUT	Timeout of defrost	See DTO parameter
CPH COMPRESSOR ON	Percentage of usage of compressor too high (greater than CPH parameter)	SeeCPH param
PROBE FAULT	Probe fault	Temperature is outside specified range
PRESSURE SWITCH ON	Pressure switch on fault (not managed)	
BLACK-OUT FAULT	Black-out Fault	No mains for more than BOD param minutes
RTC DATE/HOUR LOST	RTC is not working (date and hour is not correct)	Hw internal error
FLASH SPI FAULT	Internal flash memory fault	Hw internal error
NVAR. CHK ERROR	Internal memory variables is not valid	Hw internal error
EVENT LIST ERROR	Event list error	Hw internal error
LOGGER ERROR	Logger error (data on logger are not valid)	Hw internal error
12V LED PWR FAULT	Power fault on 12V for LED light output	Hw fault
12V FAN PWR FAULT	Power fault on 12V for fan outputs	Hw fault
LCP CPU PWR FAULT	Power fault on control part of the board	Hw fault (LCP CPU Voltage is outside the nominal voltage value)

LCS CPU PWR FAULT	Power fault on security part of the board	Hw fault (LCS CPU Voltage is outside the nominal voltage value)
LINK LCPS COMM FAULT	Fault on comunication between control and security parts	Hw fault
AC MAINS VOLTAGE LOW	AC mains voltage is too low	If AC mains voltage is lower than 200V
DC POWER VOLTAGE LOW	DC (12V) power voltage is too low	Hw fault (If DC Power Supply Voltage detected by LCP is lower than 11VDC)
SECURITY FAULTS LIST		
SECURITY PROBE FAULT	Security probe fault	(Temperature is outside specified range)
SECURITY EEPROM FAULT	Internal securtity part memory fault	Hw fault
SECURITY EVENT LIST ERROR	Security part event list error	Hw fault
SECURITY CONST AREA ERROR	Security part internal constant values error (data not valid)	Hw fault
LINK LCPS COMM FAULT	Security comunication error (with control part)	Hw fault
DC POWER VOLTAGE LOW	Security DC power voltage is too low	Hw fault (If DC Power Supply Voltage detected by LCS is lower than 11VDC)

LCP PARAMETERS

COD	DESCRIPTION
ADR	Controller LCP serial address
ALL	Low temperature alarm differential
ALH	High temperature alarm differential
AAL	Absolute low temperature alarm limit
AAH	Absolute high temperature alarm limit
ALD	Alarm intervention delay
ADD	Alarm delay after switching on, after defrosting, during cell loading
DTX	Maximum permitted temperature difference between probe LCPRTD1 and LCPRTD2
DTD	Alarm delay for temperature difference between probe LCPRTD1 and LCPRTD2
BOD	Maximum permissible blackout duration
VOP	Visualization Options Superparameter
ISP	Inputs configuration Superparameter
OSP	Outputs configuration Superparameter
DIN	Door switch (0=not used, 1=OFF comp and fan evap, 2 OFF fan evap)
DOO	Maximum allowed door opening time
OF1	LCPRTD1 probe offset
OF2	LCPRTD2 probe offset
SET	Cold action setpoint
HYH	Cold action high hysteresis
HYL	Cold action low hysteresis
SLL	Lower limit of the main control setpoint
SLH	Upper limit of the main control setpoint
CCD	Regulation delay
ADS	Delay time after system power-up
ADL	Minimum time between two consecutive starts of the compressor
CON	Compressor ON time during main-probe fault or CPH warning

COD	DESCRIPTION
COF	Compressor OFF time during main-probe fault or CPH warning
CPH	Maximum percentage of compressor use
COP	CO2 configuration Superparameter
CSP	CO2 output activation threshold
TCO	CO2 output activation time
BCO	CO2 minimum time between two consecutive activations
PTD	Differential for dirty condenser warning
FCE	Condenser Fan Setpoint
MCT	Maximum Condenser Temperature
FOP	Evap/Cond Fans Options Superparameter
FAS	Evaporator Fan Setpoint
FAD	Evaporator fan activation delay after defrost
FSD	Evaporator fan setpoint during defrost
LET	Low Evaporator Temperature differential
DOP	Defrost Options Superparameter
DCM	Defrost Compressor Mode
DRP	Dripping Time
ITD	Interval between defrosts
DTE	Defrost Temperature End
DTO	Defrost Time Out
DEO	Time interval of additional defrosts
SPX	Setpoint Frame Heater

COD	DESCRIPTION
AD1	Start time of the 1st RTC defrost (if enabled)
AD2	Start time of the 2nd RTC defrost (if enabled)
AD3	Start time of the 3rd RTC defrost (if enabled)
AD4	Start time of the 4th RTC defrost (if enabled)
CDT	Partialisation band in condenser fan temperature
FCN	Minimum percentage speed of the condenser fan
FCX	Maximum percentage speed of the condenser fan
EDT	Partialisation band in evaporator fan temperature
FEN	Minimum percentage speed of the evaporator fan
FEX	Maximum percentage speed of the evaporator fan
HPO	Humidity probe calibration
HUM	Humidity setpoint
HRH	Dehumidification output activation hysteresis
HRL	Humidification output activation hysteresis
VBH	Battery management parameter (still to be defined)
VBL	Battery management parameter (still to be defined)
VBX	Battery management parameter (still to be defined)
VBY	Battery management parameter (still to be defined)
CSO	Compressor SetOn Time
CSH	Compressor SetOn Hysteresis

COD	DESCRIPTION
CSD	Compressor SetOn Delta
CNS	Compressor Minimum Speed
CXS	Compressor Maximum Speed
DCS	Delta Compressor Speed
P49	Additional Variable Speed Compressor Parameter (still to be defined)
P4A	Additional Variable Speed Compressor Parameter (still to be defined)
P4B	Additional Variable Speed Compressor Parameter (still to be defined)
TPD	Tempo di ritardo accensione del compressore ausiliario
TMI	Setpoint di attivazione compressore ausiliario
HYA	Isteresi di regolazione compressore ausiliario
OFS	Offset sonda ntc impianto
LBO	LED Light Brightness Door Open
LBC	LED Light Brightness Door Close
LFU	LED Light Fade Up Time
LFD	LED Light Fade Down Time
LOD	Led Light OFF Delay
PO1	Configurazione Uscite Gruppo 1
PO2	Configurazione Uscite Gruppo 2
PO3	Configurazione Uscite Gruppo 3
PI1	Configurazione Ingessi Gruppo 1
PI2	Configurazione Ingressi Gruppo 2
OP1	Offset sonda NTC P1
OP2	Offset sonda NTC P2
OP3	Offset sonda NTC P3
OP4	Offset sonda NTC P4

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SO-LOW
ENVIRONMENTAL EQUIPMENT COMPANY