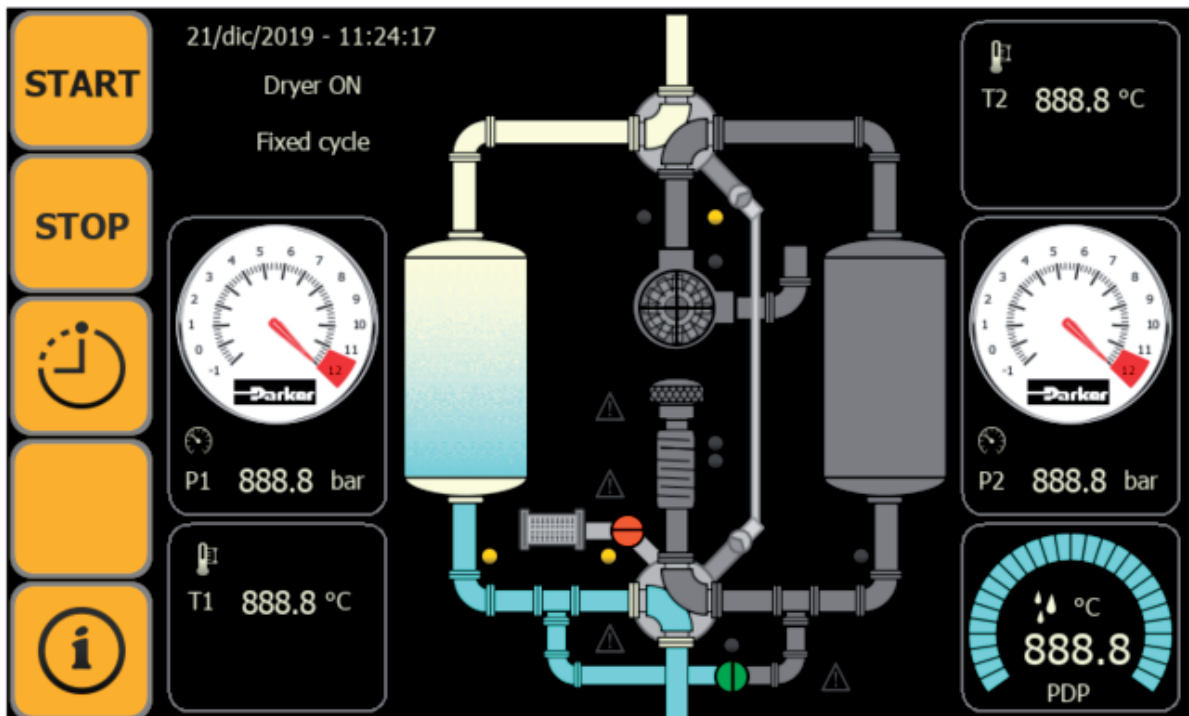


HCDC

Hyper-Connected Dryer Controller



Operating Manual

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1. Dati sul produttore

Nome ed indirizzo



Parker Hannifin Manufacturing S.r.l.

Sede Legale: Via Privata Archimede, 1- 2009 Corsico (MI) Italy

Sede Operativa: **Gas Separation and Filtration Division EMEA** - Strada Zona Industriale, 4

35020 S.Angelo di Piove (PD) Italy

tel +39 049 971 2111- fax +39 049 9701911

Web-site: www.parker.com/hzd

e-mail: technical.support.hiross@parker.com

2. About these operating instructions

The present Operating Instructions contain basic information regarding safe operation of the controller and are only valid in conjunction with the manual of the respective dryer. For this reason, the present operating instructions are a supplement to the manual of the dryer.

Characters and symbols used

- ▶ Work steps that you have to carry out in the sequence stated are marked by black triangles.
- Lists are marked by a small box.

Note:

These notes provide tips for safe and efficient handling of the controller.

**Caution!**

These safety notes warn against damage to property and help you to avoid such damage.

**Danger!**

These danger notes with a grey background warn against personal injury and/or danger to life and limb; danger notes help you to avoid serious or life-threatening situations for yourself and/or third parties.

Target group for the present operating instructions

The present operating instructions address all persons who work with and on the controller. We assume that these persons must be expert and qualified technicians.

Operating instructions: handling

These operating instructions must be continuously available at the site where the dryer is used. We recommend to prepare a copy and to keep the same in a safe and freely accessible place next to the dryer. Keep the original document in a safe place.

Supplementary documents

The present Operating Instructions represent a supplement to the manual of the dryer. All notes given there must be heeded, in particular all notes on safety.

Warranty notes

Heed the warranty notes given in the enclosed dryer manual. The statements made there also apply to the controller.

3. Technical data

3.1 Technical features

Schermo tattile LCD a colori

- Resolution: 7" TFT 16:9 64k 800x480
- Operating temperature: from -0° C to a +50° C
- Storage temperature: from -20° C to a 70° C
- Protection class IP65
- Dimensions (L x A x P: 182 x 140 x 95 mm)

Integrated P&ID flowchart

- Providing excellent overview

Memoria interna

- Permanent logging of measured data at 60 seconds minimum
- Evaluation and display in curve chart
- Possibility to download the recorded data to USB memory without having to open the electrical panel.

Connessione Ethernet

- RJ45 with web service

Moduli di comunicazione (disponibili in via opzionale)

- Profibus (DPVO; Profinet)
- Modbus RTU on RS485 and Modbus TCP/IP on RJ45 (standard)

Analog outputs

- 2 analog outputs 4-20 mA, Two measuring points can be selected for transmission

Floating contacts

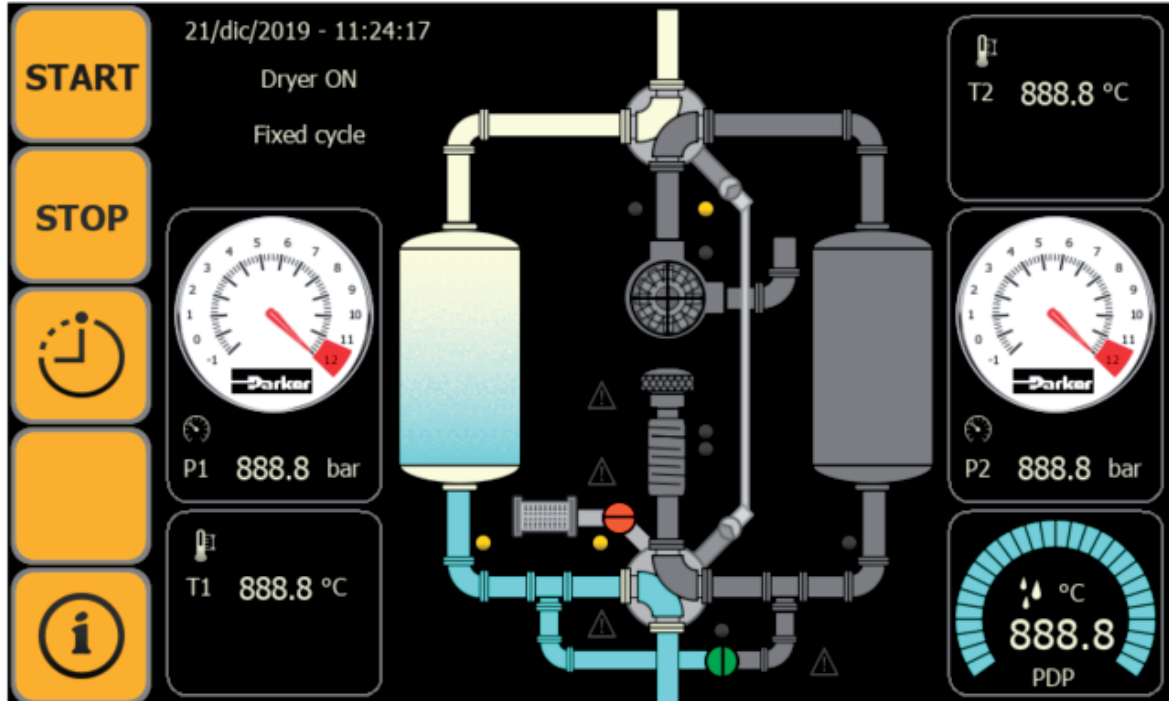
- Collective alarm

4. Overview of the operating and display elements

The operating panel in the switch cabinet door is used to check the operating status and to edit parameters. The display is a *Touch Screen Panel*.

4.1 The main display

The dryer status appears on the display after power on.

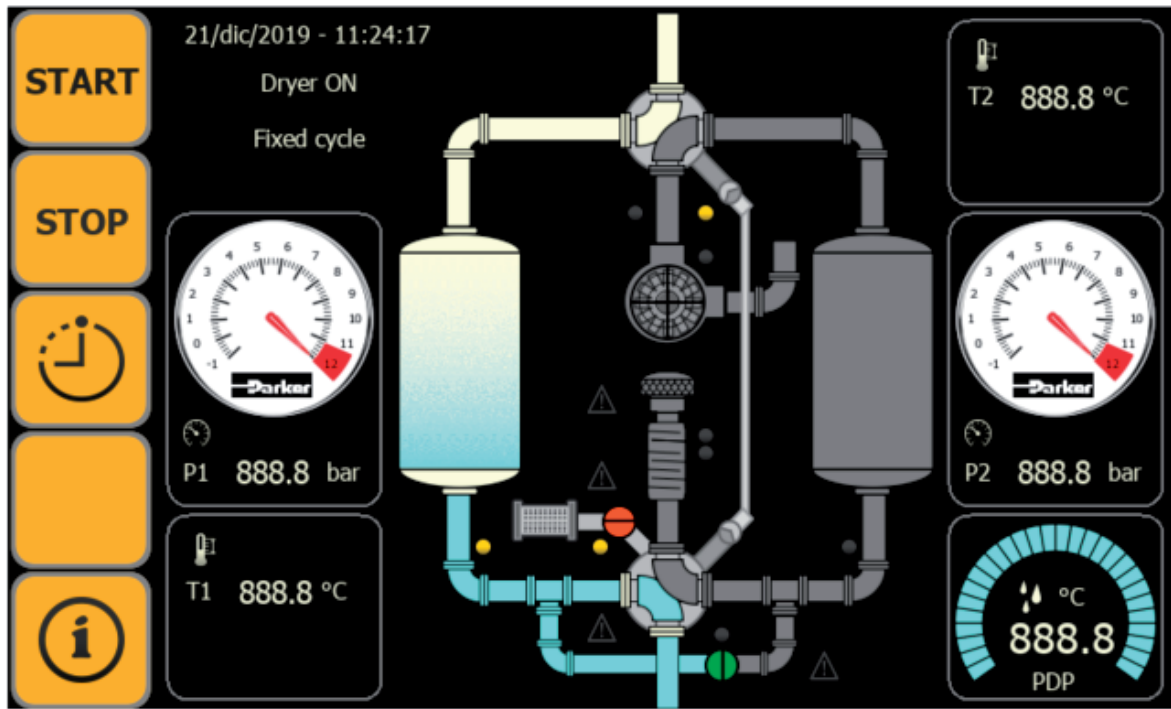


The main display





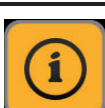
The display shows the following values:






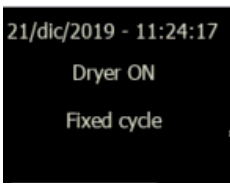
- the dryer status (ON/OFF), and the current cycle of the vessel
- the current vessel pressure in bar (B1/B2)
- the measured temperature at resistance thermometers R1 and R2 in °C
- the current pressure dewpoint in °C .
- the cycle the dryer is in (fixed or dewpoint-dependent)

The main display is also the start display for navigation in the menu.



The flow chart view provides a graphic overview of the current state of devices and components. Alarms are also attributed to each of the components. The respective component is marked red in the flow chart and an alarm symbol lights up when an error occurs.

	touch the button to switch on the dryer
	touch the button to switch off the dryer
	touch the button to see the machine status (standby, adsorption, regeneration, pressurization...)
	touch the button to see the activated alarms or the alarms history.
	touch the button to enter in the system menu

 <p>A circular pressure gauge with a white face and black markings from -1 to 12. A red needle points to 8.88. Below the gauge, the text 'P1 888.8 bar' is displayed.</p>	<p>Shows the pressure trend in the tank N°1</p>
 <p>A circular pressure gauge with a white face and black markings from -1 to 12. A red needle points to 8.88. Below the gauge, the text 'P2 888.8 bar' is displayed.</p>	<p>Shows the pressure trend in the T1 N°2</p>
 <p>A semi-circular gauge with a blue arc and white markings. It shows a dew point trend with a red needle pointing to 888.8. Below the gauge, the text 'PDP 888.8 °C' is displayed.</p>	<p>Shows the dew point trend (min/max)</p>
 <p>A square gauge with a black background and white text. It shows a heating temperature T1 with a red needle pointing to 888.8. Below the gauge, the text 'T1 888.8 °C' is displayed.</p>	<p>Shows the heating temperature T1 See par. 6.3.5 to visualize on main display the inlet air compressed temperature T3.</p>
 <p>A square gauge with a black background and white text. It shows a rigeneration temperature T2 with a red needle pointing to 888.8. Below the gauge, the text 'T2 888.8 °C' is displayed.</p>	<p>Shows the rigeneration temperature T2 See par. 6.3.5 to visualize on main display the outlet air compressed temperature T4.</p>
 <p>A square display with a black background and white text. It shows the date and time '21/dic/2019 - 11:24:17', the status 'Dryer ON', and the cycle type 'Fixed cycle'.</p>	<p>Shows date/hour and dryer condition.</p>

5. Starting and stopping the dryer

Make sure all necessary preparations have been made. For this purpose, follow the attached dryer manual.

The Dryer is equipped with an electrical panel with a main switch that give/remove the supply voltage.

Note


For the correct functioning of the installed valves it is necessary that the system is under pressure! The pressure must be higher than 4 bar (sp).

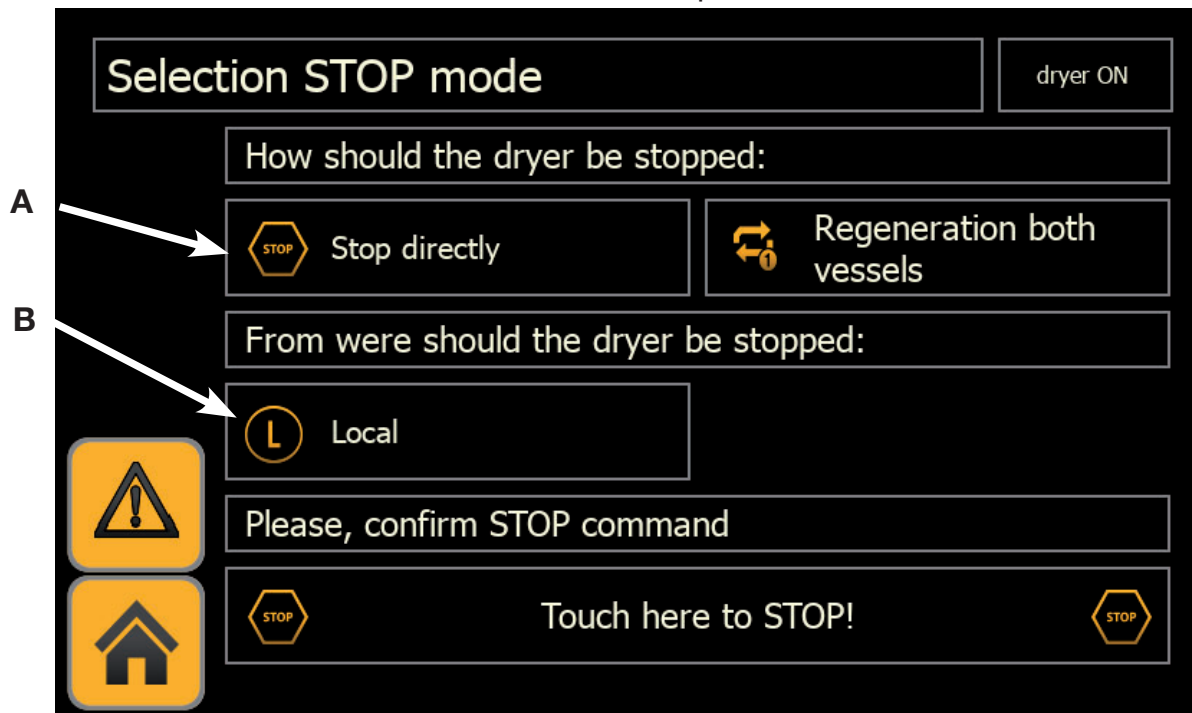
- ▶ Set the main switch to “I”.
- ▶ The display lights up on the main screen.

- ▶ Touch **START**  to start the dryer.

The dryer now runs fully automatically according to the stored operating parameters.

Stopping the dryer (stop program)

- ▶ Touch **STOP**  to enter on the “start/stop” menu:



Display: Stop

Note:

You should always prefer the “normal stop” function to ensure the current regeneration cycle can be completed before the dryer shuts down.

Note:

Regeneration will be incomplete when the dryer is stopped with “direct stop” in a phase other than the standby phase (e.g. heating or cooling). As a result, the set pressure dew point may initially not be achieved when re-starting.

When switching off during the heating stage, the safety thermostat on the heater may be triggered. When re-starting, the dryer then runs without heating and does not regenerate properly.

You can stop the dryer in various ways:

Touch the button “A” to set the condition normal/direct.

Touch the button “B” to set the condition local/remote.

■ **Local shut down with normal stop**

(chose “Normal stop”- “Local”)

The dryer is switched off directly via the display. The current regeneration cycle terminates before the program stops. The fully regenerated vessel remains unpressurised. The pressure build-up phase only occurs after the dryer was restarted.

- Under these conditions the regeneration solution of one or both tanks is made available. (“Regeneration of both tanks”).

■ **Local shut down with immediate stop**

(chose “Stop directly”- “Local”)

The dryer is also switched off via the display. The program stops immediately, the current cycle is not completed.

■ **Remote shut down with normal stop**

(chose “Normal stop”- “Remote”)

The dryer is shut down by a control center. The current regeneration cycle will be completed. The fully regenerated vessel remains unpressurised. The pressure build-up phase only occurs after the dryer was restarted.

- Under these conditions the regeneration solution of one or both tanks is made available. (“Regeneration of both tanks”).

■ **Remote shut down with direct stop**

(chose “Stop directly”- “Local”)

The dryer is also shut down by a control center. The program stops immediately, the current cycle is not completed.


■ **Stopping the dryer**

▶ Touch “**touch here to stop**” in the “start/stop” menu or in the flow chart display.

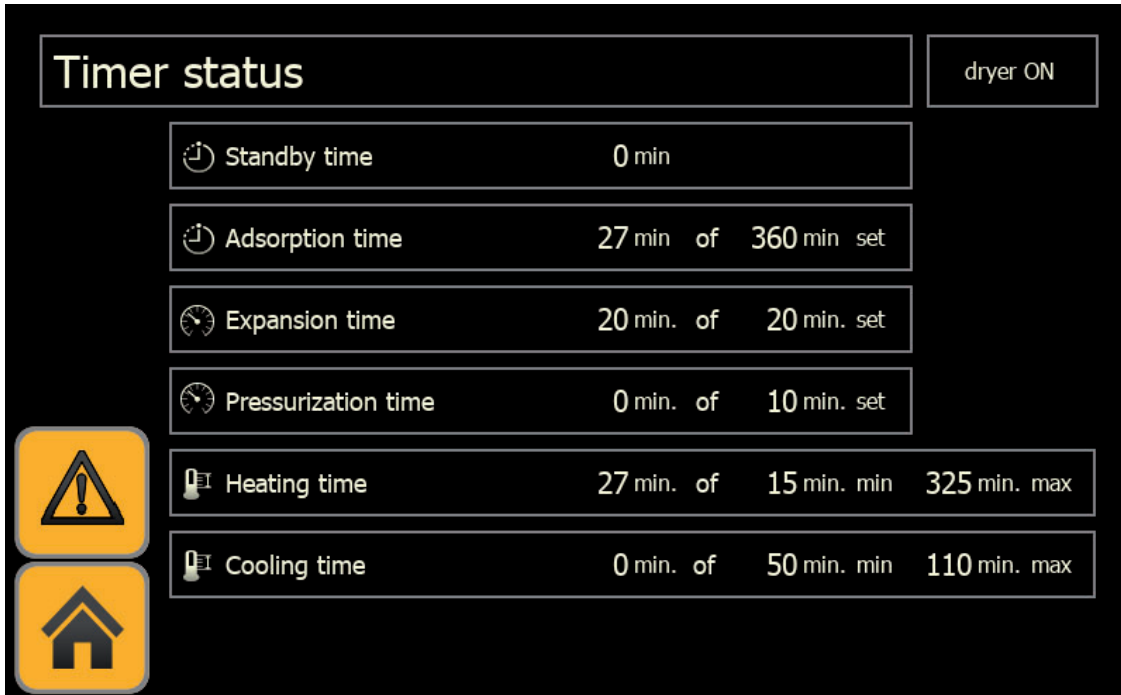
On the main display, you could see the deactivation fo the dryer.

6. Status menu

The main menu is the entry point for the controller's navigation systematics. You can easily go to any submenu from here. To open the main menu, proceed as follows:

- ▶ On the main menu touch the button .

The following display appears:



The screenshot shows a 'Timer status' menu with a 'dryer ON' indicator in the top right corner. The menu lists several time intervals with their current values and set points:

Category	Current Value	Set Point
Standby time	0 min	-
Adsorption time	27 min	360 min set
Expansion time	20 min.	20 min. set
Pressurization time	0 min.	10 min. set
Heating time	27 min.	15 min. min 325 min. max
Cooling time	0 min.	50 min. min 110 min. max


On the left side of the screen, there are two navigation icons: a warning triangle and a home icon.

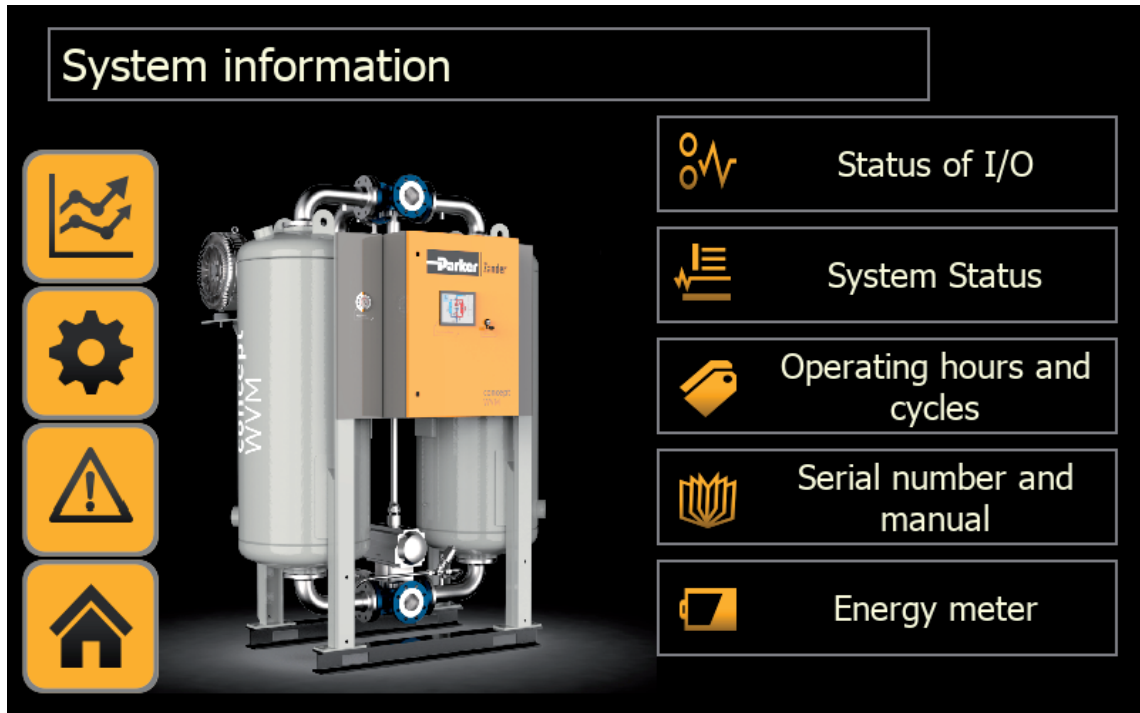
Display: Status timer menu

Visualize the working times of the dryer

7. System menu

The main menu is the entry point for the controller's navigation systematics. You can easily go to any submenu from here. To open the main menu, proceed as follows:

- ▶ On the main menu touch the button  .
- The following display appears:












Display: menu Sistema

Here you can press the respective key to enter the corresponding submenu.

7.1 Viewing system information

In the system menu you can find all the operating temperature / pressure / dewpoint information and those relating to the dryer.

	Enter on Graphics menu: pressure / temperature / dewpoint graphs, data download, delete data
	Enter on Set menu: pressure, dewpoint, communication, language, HMI.
	Enter on Alarm menu: shows all the alarms, and all intervened alarms.
	Return to the main display.
 Status of I/O	Enter on “status I/O” menu: digital input/output, analogic output and set of the analogic output.
 System Status	Enter on “System status” menu: shwos the actual conditions of the dryer.
 Operating hours and cycles	Enter on “work hour” menu: shows work huors of the dryer, vacuum pump and other parameter.
 Serial number and manual	Enter on “serial number “ menu: shows release softwa-re, serial number, e work hours.
 Energy meter	Enter on “Energy meter” menu.









7.2 Graphics menu



The following display appears:



Display: Graphics

	Send to the previous screen
 trend recording interval	Adjust the sampling time
 Temperatures trend	Shows the trend of the temperature actual and previuos
 Pressures trend	Shows the trend of the pressure actual and previuos
 Please, Insert USB Drive	Enables the insertion of a USB key for data recording
 Dew point trend	Shows the trend of the dew point actual and previuos
 Energy bar graph	Shows the trend of the enery
 DELETE TRENDS	Reset the dates.

7.2.1 Sampling interval



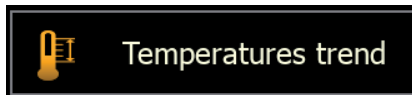
- ▶ Touch the button

Appear a numeric keyboard

- ▶ Enter the desired sampling time (minimum=60; maximum=3600 seconds).
- ▶ Touch “Enter” to confirm.

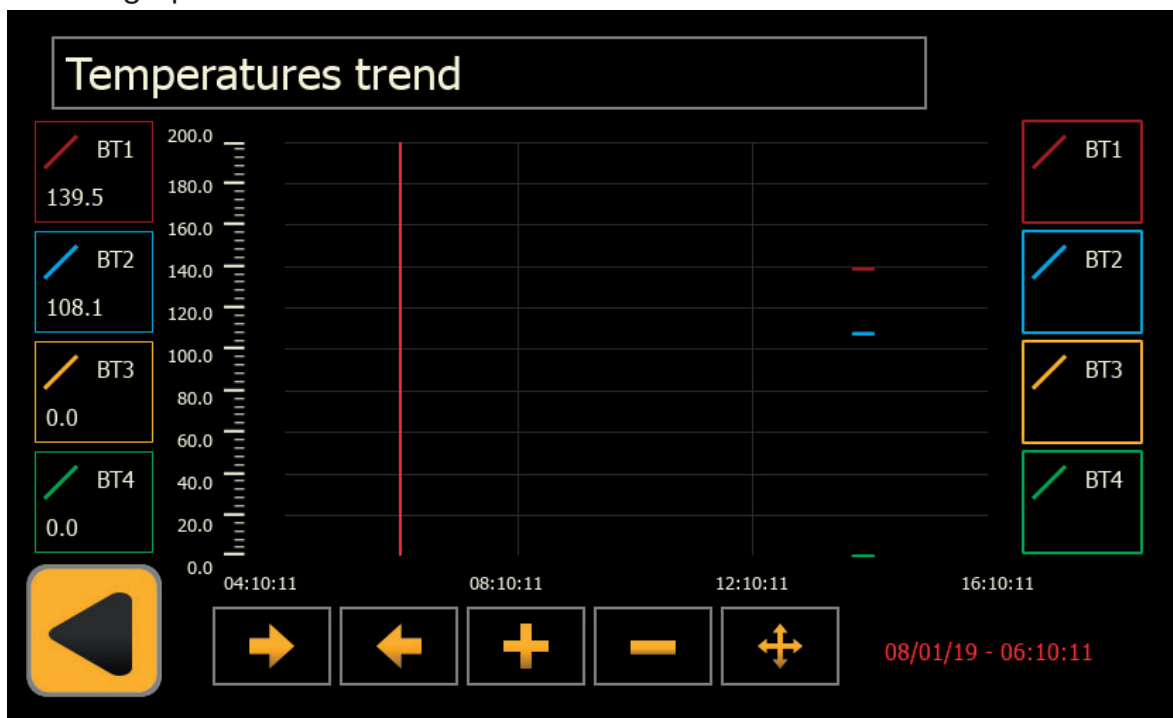
the number for the Sampling appears on the left of “trend recording interval”.

7.2.2 Temperature graphic



- ▶ touch

Appear the graphic



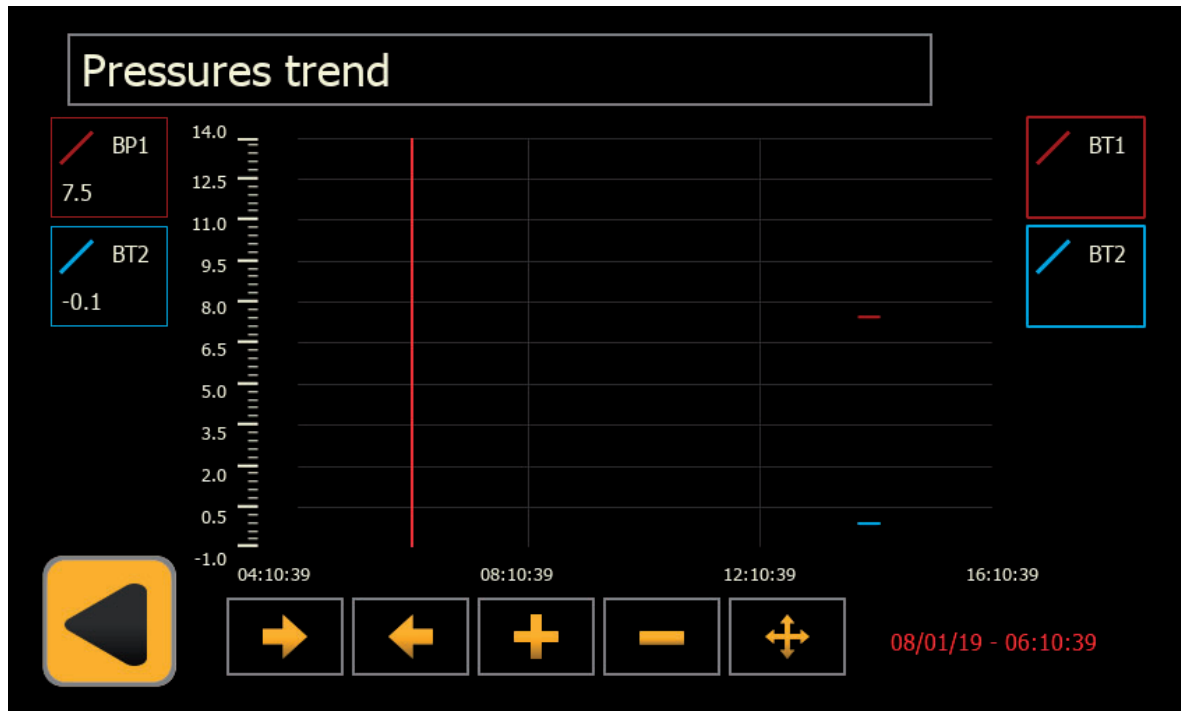
Display: graphic temperature

- on the left the actual value of temperature: BT1(R1), BT2(R2), BT3(R3), BT4(R4)
- on the right the value of BT1(R1), BT2(R2), BT3(R3), BT4(R4) read at the red line, which can be moved to the right and left to see all the values previously recorded by the dryer. The date and time of the recording indicated by the red line is shown at the bottom right.

7.2.3 Pressure graphic



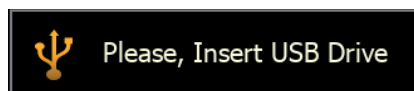
- ▶ touch
- Appear the graphic



Display: Pressure graphic

- on the left the actual value of pressure BP1, BP2 actuali
- on the right the value of BP1, BP2 read at the red line, which can be moved to the right and left to see all the values previously recorded by the dryer. The date and time of the recording indicated by the red line is shown at the bottom right.

7.2.4 USB



- ▶ touch
- insert the USB drive in the appropriate hole located in the front panel of the electrical panel.

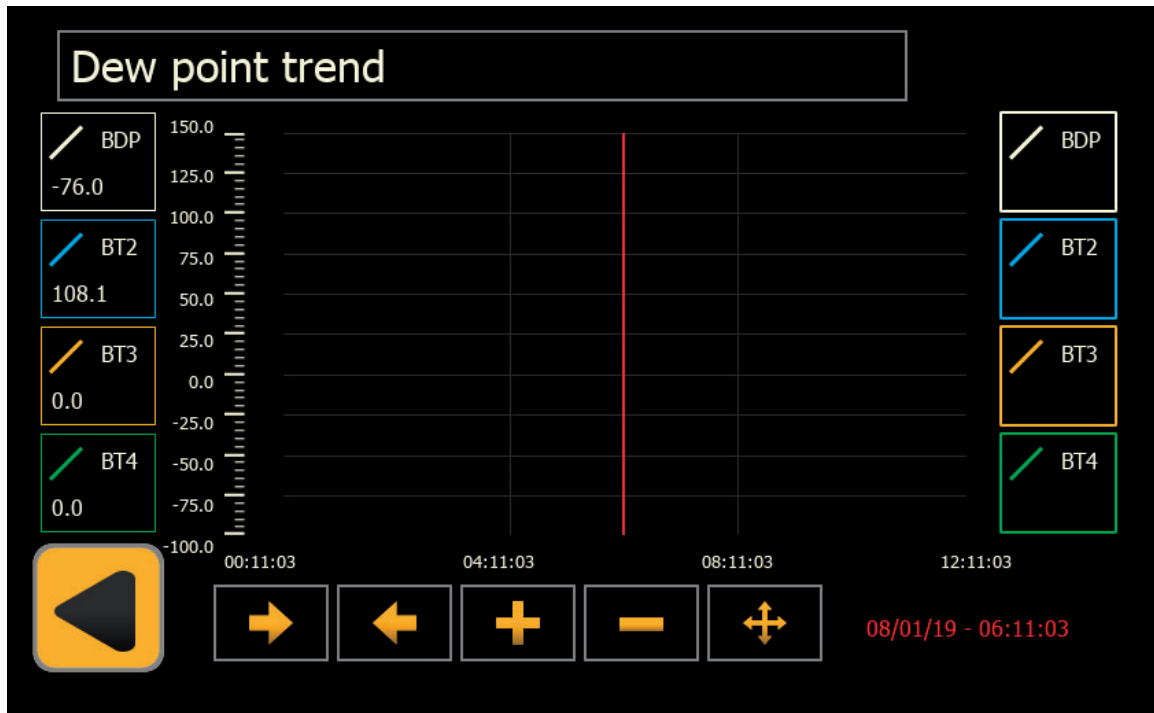
The display changes the buttons:

- ▶ “**Please, Insert USB drive**” change in “**Save the data**”
- ▶ appear onther button that allows the extraction of the USB.

Once the keys have been removed, return to the previous display.

7.2.5 Dew point graphic

► touch  Dew point trend
Appear the graphic



Display: dew point graphic

- on the left the actual value of dew point and temperature BDP, BT2(R2), BT3(R3), BT4(R4)
- on the right the value of BDP, BT2(R2), BT3(R3), BT4(R4) read at the red line, which can be moved to the right and left to see all the values previously recorded by the dryer. The date and time of the recording indicated by the red line is shown at the bottom right.

7.2.6 Energy graph

- ▶ touch  Energy bar graph
Appear the graph.

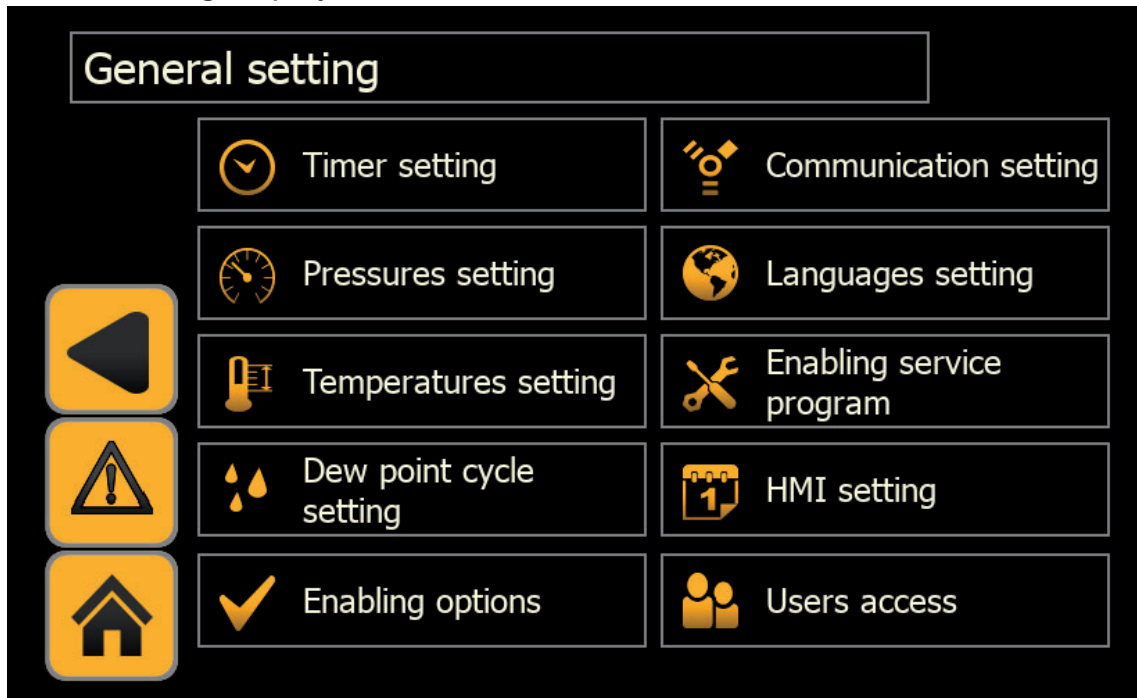
Reset

- ▶ touch  DELETE TRENDS
all recorded data is deleted.

7.3 General setting menu




Appear the following display



Display: General setting

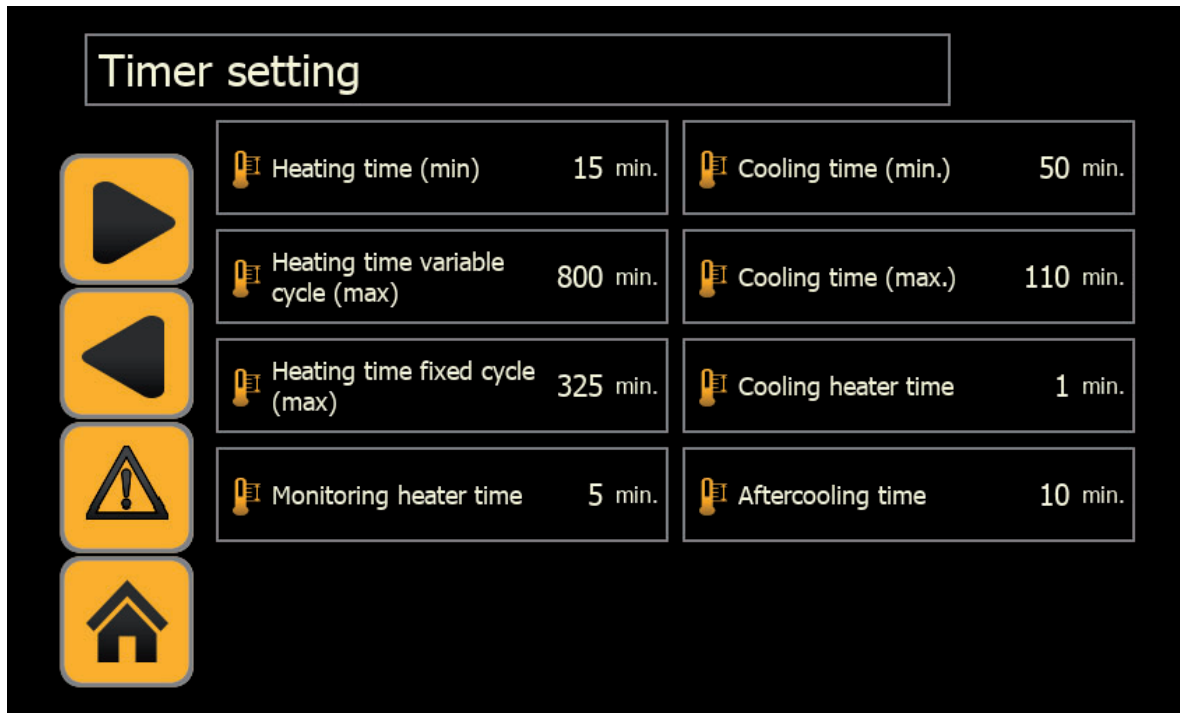
Timer setting	Shows the set time: heating (fixed, variable), cooling and the heater
Pressures setting	Shows the pressure min.max. and the actual value of dessicant beds of the vessel.
Temperatures setting	Shows the set temperature and the actual value of sensor BT1 e BT2
Dew point cycle setting	Shows the dew point set, the cycle and the actual value of the dew point.
Enabling options	Shows all the option
Communication setting	Configuration fo the Modbus (RTU/TCP-IP)
Languages setting	Chosse the language
Enabling service program	Reserved for service personnel
Set Data Time	For set date and hour
Users access	For create a personal password

7.3.1 Timer setting menu

 Timer setting

▶ touch

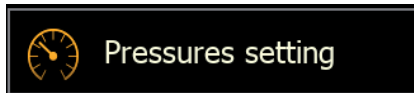
Appear all cycles timer setting and actual state of the dryer



Display: timer setting

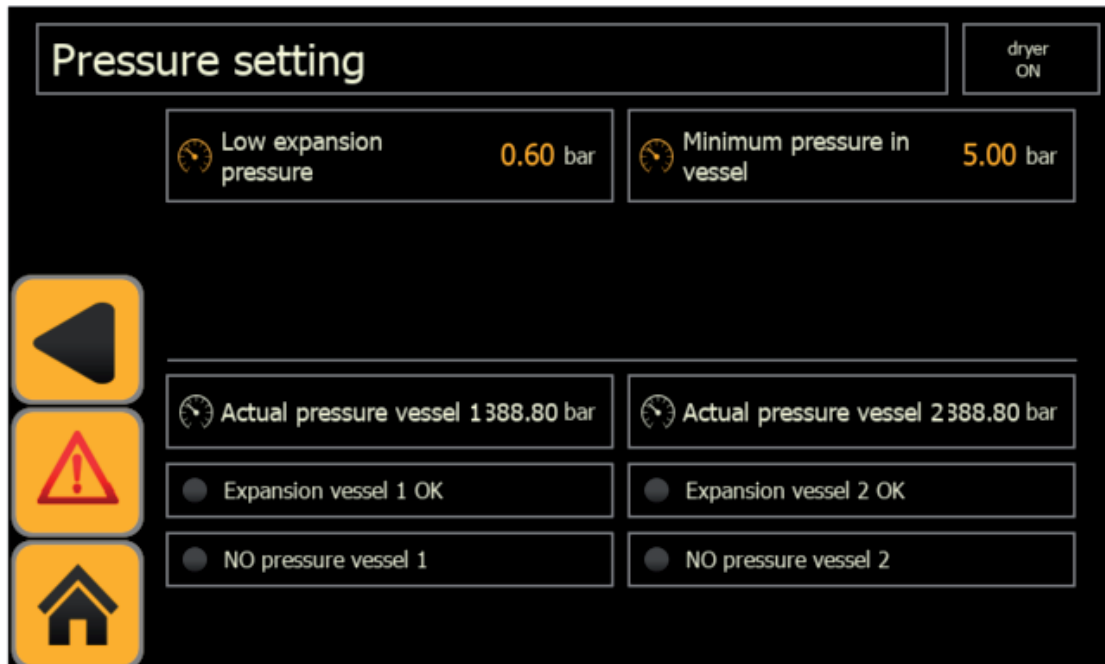
- Some value are changeable and other value are for authorized personnel.
- ▶ Touch the parameter to see the numeric keyboard and modify the value. Enter to confirm, so the new value appears on the right of the parameter.

7.3.2 Pressure setting menu



► toccare

Appear all pressures setting actual state of the dryer



Display: pressure setting

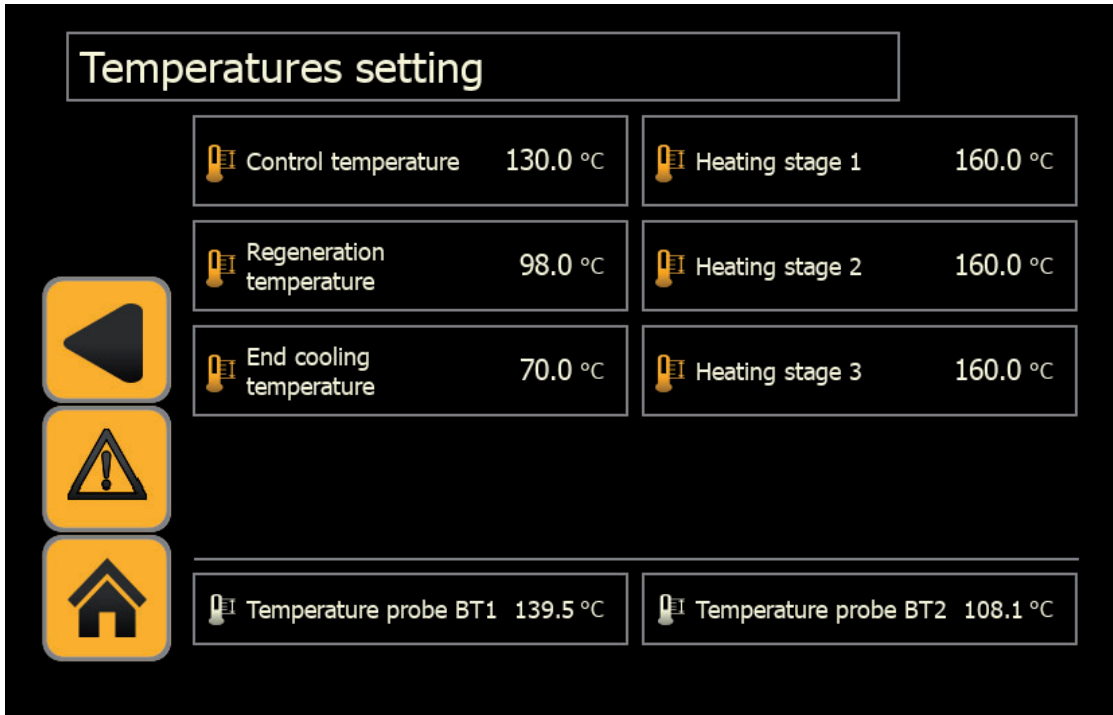
- Some value are changeable and other value are for authorized personnel.
- Touch the parameter to see the numeric keyboard and modify the value. Enter to confirm, so the new value appears on the right of the parameter.









7.3.3 Temperatures setting menu

Temperatures setting

► touch

Appear all temperatures setting and the actual values of the sensors.



Temperatures setting	
 Control temperature	130.0 °C
 Heating stage 1	160.0 °C
 Regeneration temperature	98.0 °C
 Heating stage 2	160.0 °C
 End cooling temperature	70.0 °C
 Heating stage 3	160.0 °C
 Temperature probe BT1	139.5 °C
 Temperature probe BT2	108.1 °C

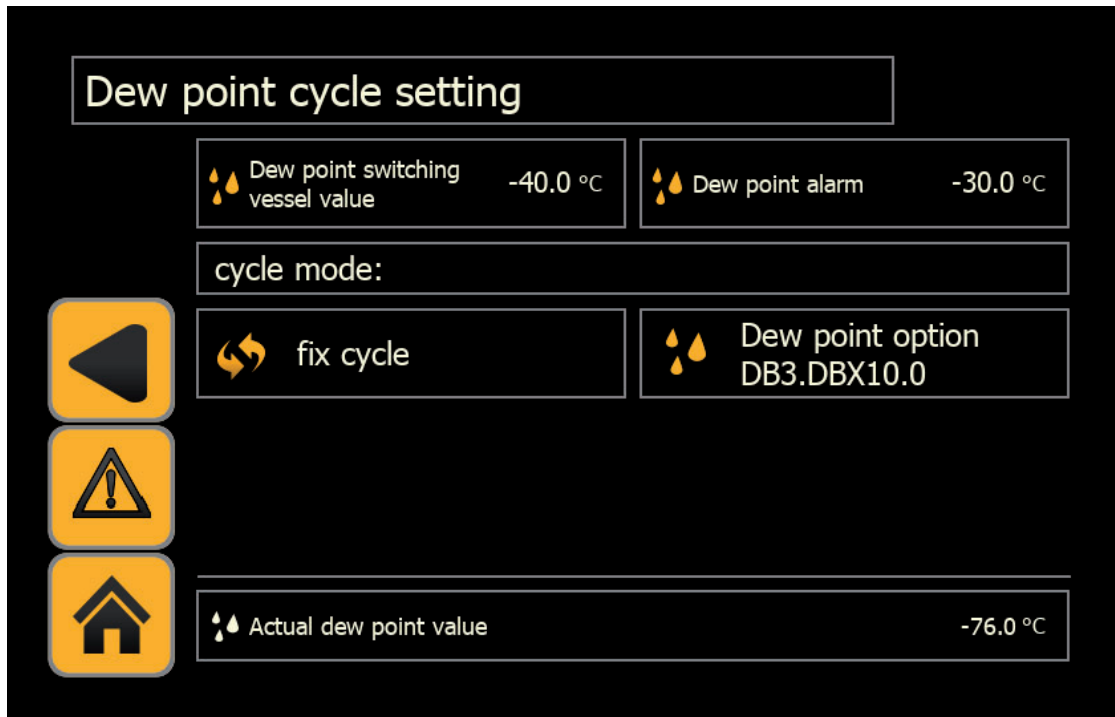
Display: temperatures setting

- Some value are changeble and other value are for authorized personnel.
- Touch the parameter to see the numeric keyboard and modify the value. Enter to confirm, so the new value appears on the right of the parameter.

7.3.4 Dew point menu



Appear the dew point set, typo of cycle, option and actual value of the dew point



Display: dew point

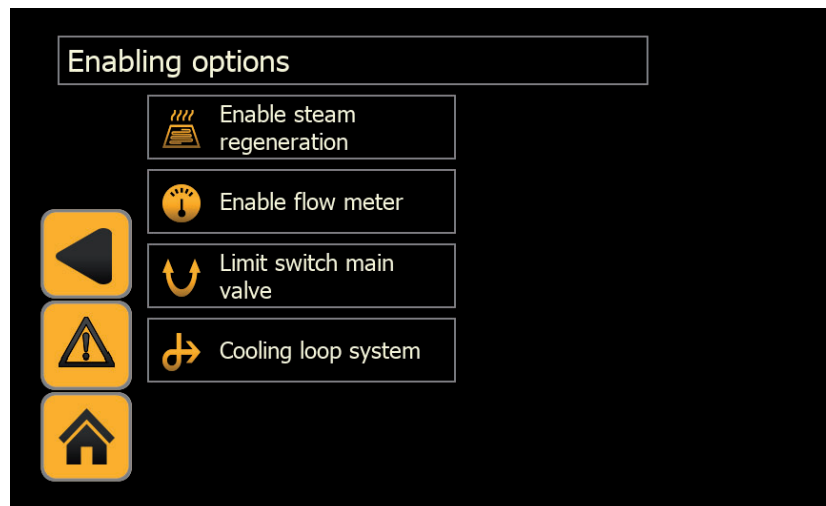
- Some value are changeble, other value are for authorized personnel.
- ▶ Touch “**fix cycle**” to change the cycle (fixed/variable).
- ▶ Touch the parameter to see the numeric keyboard and modify the value. Enter to confirm, so the new value appears on the right of the parameter.

7.3.5 Option set menu

✓ Enabling options

▶ touch

Appear the list of the option.



Display: option

■ the first list shows the additional probes and in the second the options resulting from particular customer requests.

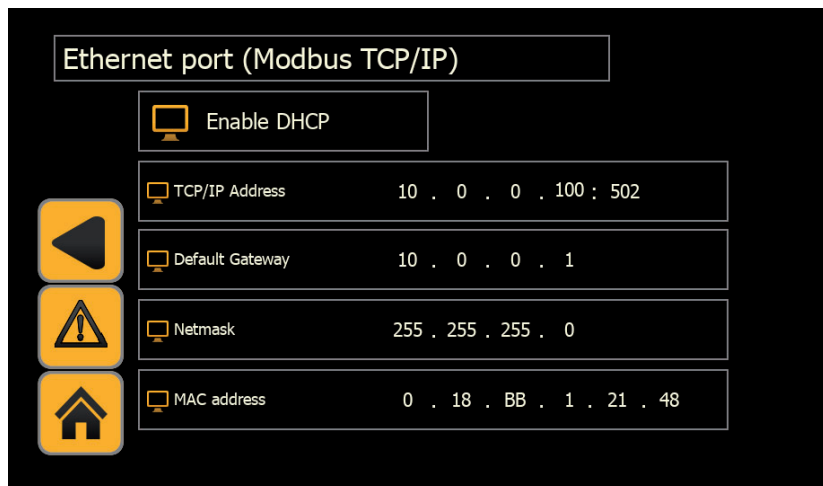
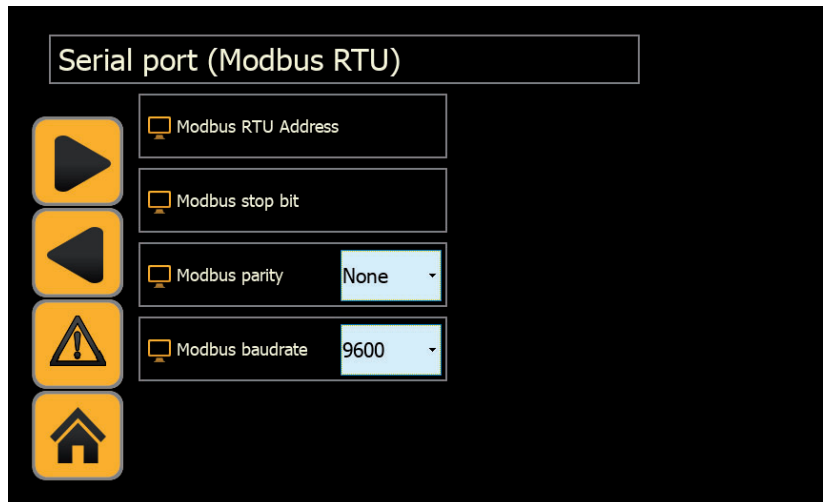
These options must be enabled by authorized personnel.

7.3.6 Set Modbus menu



▶ touch

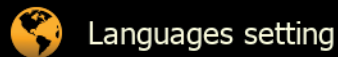
Apprer the congijuration of the Modus



Display: Modbus menu

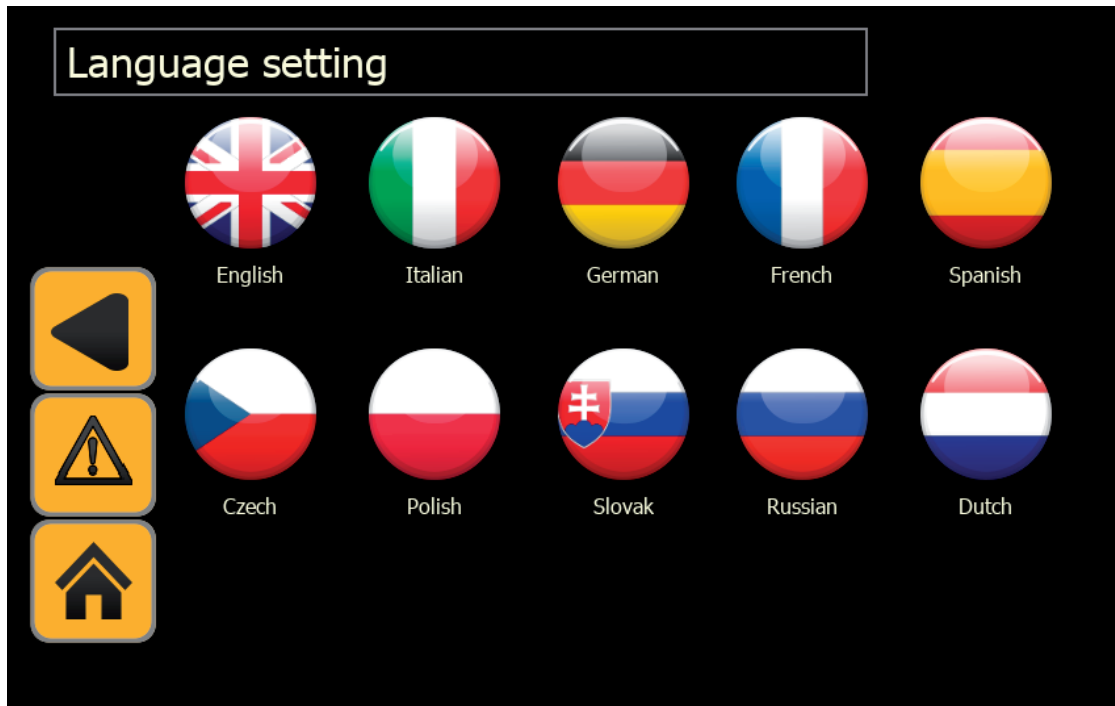
- ▶ For Modbus (RTU) it is possible to choose and change each parameter.
- ▶ For Modbus (TCP/IP) it is possible to change Adress, Getway e Netmask;
- ▶ If you select "**Enable DHCP**" it is sufiicient to give the Adress.

7.3.7 Languages menu



► touch

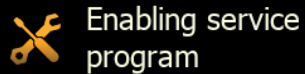
Appear the languages available



Display: language

► Simply touch the language to select it.


7.3.8 Service menu

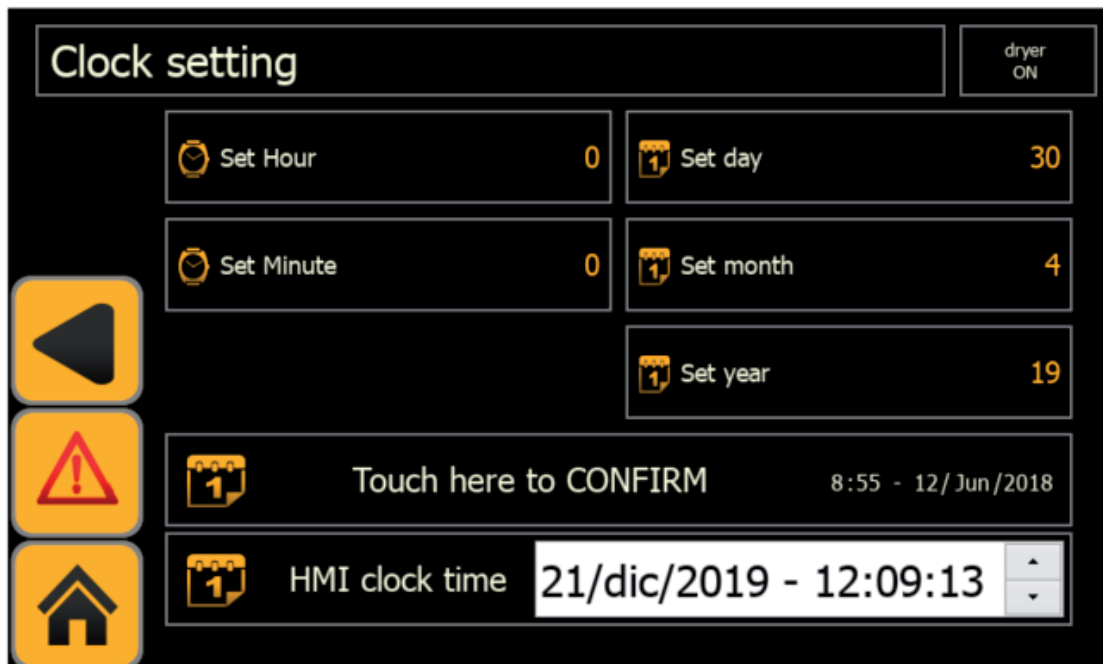


► touch

This menu is only for service personnel.
This menu is protected by password.

7.3.9 Menu HMI date/hour

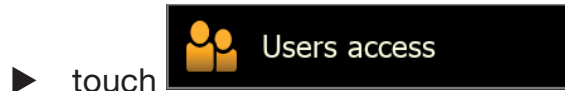
- touch  Set Data Time
Appear the following display



Display: Clock setting

Touch the fields to set the date and time that will appear in the main display.

7.3.10 Menu set user

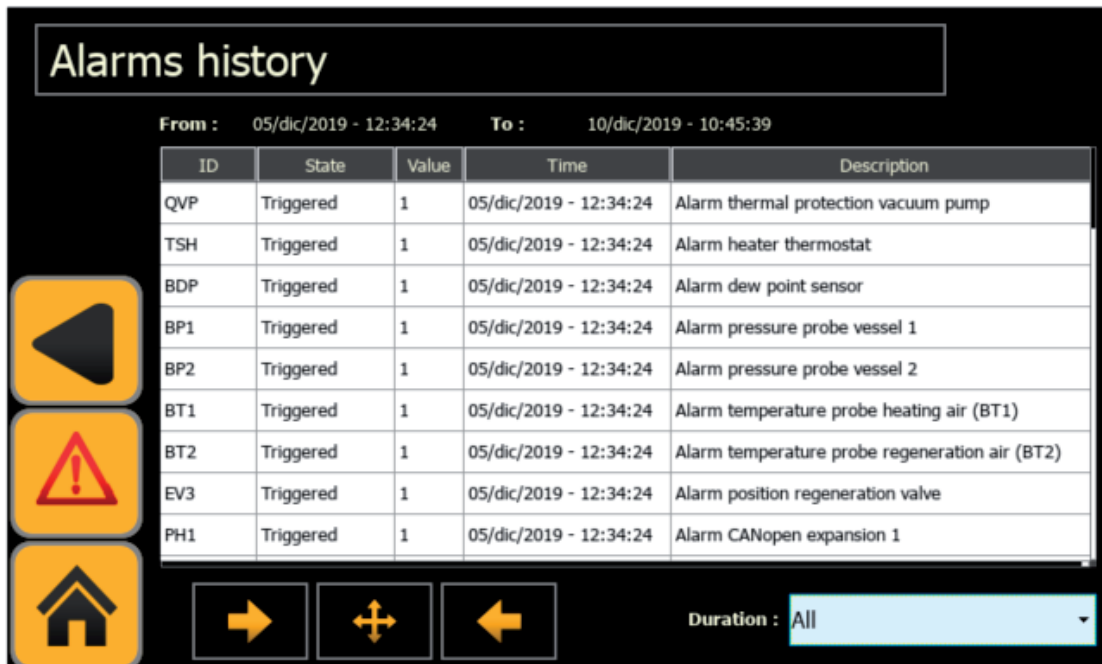


It is possible to generate your own password to block to protect your program.

7.4 Alarm menu



Appear the following display:



Alarms history

From : 05/dic/2019 - 12:34:24 To : 10/dic/2019 - 10:45:39

ID	State	Value	Time	Description
QVP	Triggered	1	05/dic/2019 - 12:34:24	Alarm thermal protection vacuum pump
TSH	Triggered	1	05/dic/2019 - 12:34:24	Alarm heater thermostat
BDP	Triggered	1	05/dic/2019 - 12:34:24	Alarm dew point sensor
BP1	Triggered	1	05/dic/2019 - 12:34:24	Alarm pressure probe vessel 1
BP2	Triggered	1	05/dic/2019 - 12:34:24	Alarm pressure probe vessel 2
BT1	Triggered	1	05/dic/2019 - 12:34:24	Alarm temperature probe heating air (BT1)
BT2	Triggered	1	05/dic/2019 - 12:34:24	Alarm temperature probe regeneration air (BT2)
EV3	Triggered	1	05/dic/2019 - 12:34:24	Alarm position regeneration valve
PH1	Triggered	1	05/dic/2019 - 12:34:24	Alarm CANopen expansion 1

Duration : All

Display: alarm

- Visualiza the list of alarms over time.

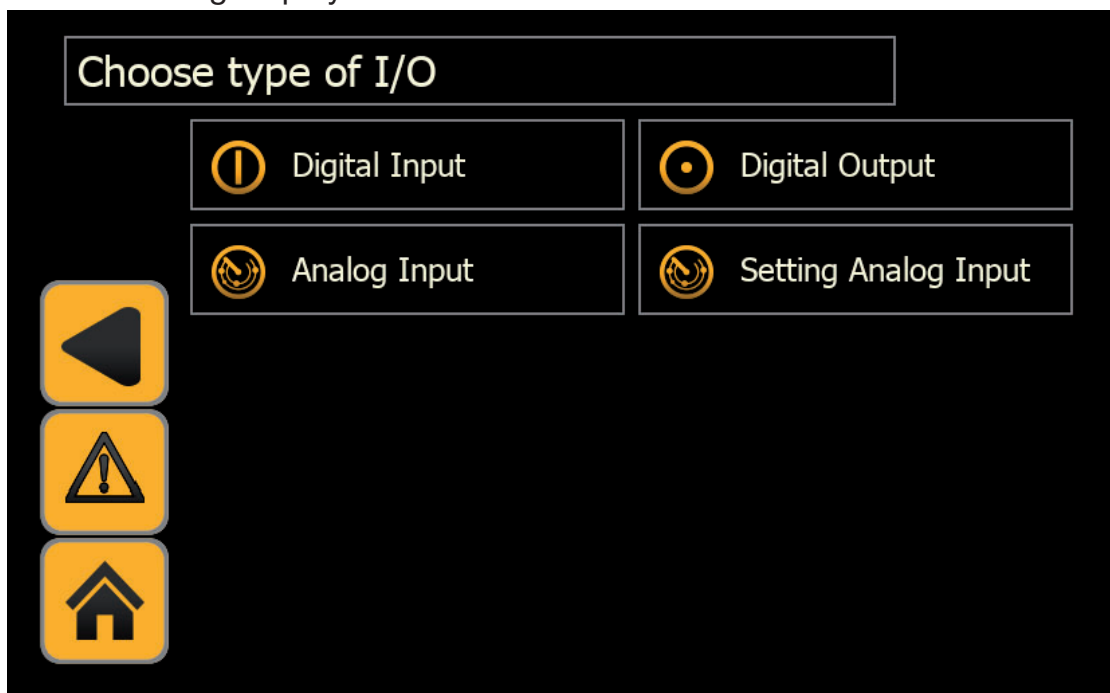
7.5 Status I/O menu



Status of I/O

► toccare

Appear the following display:

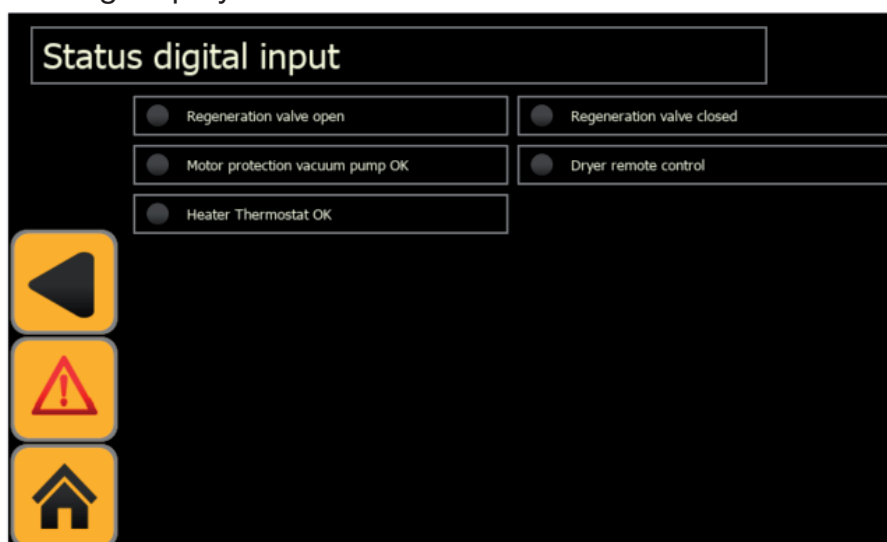


Display: Status I/O

■ Displays digital and analogue inputs, and the set of analogue inputs.

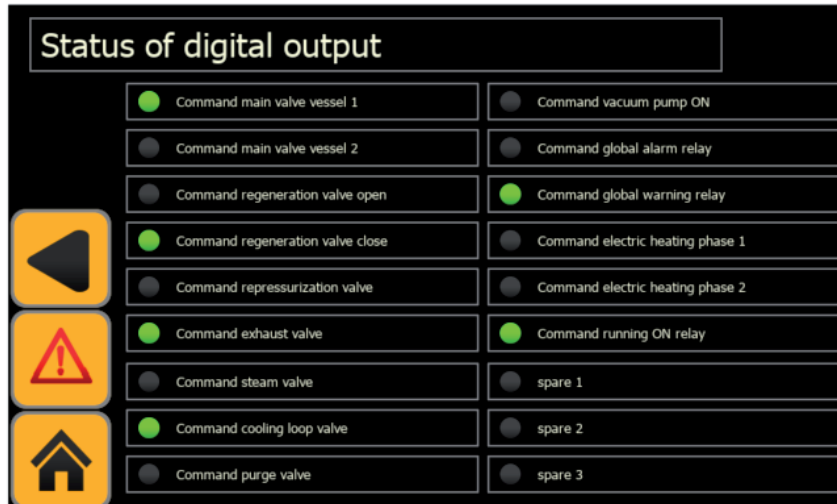
► touch “Digital input” .

Appear the following display:



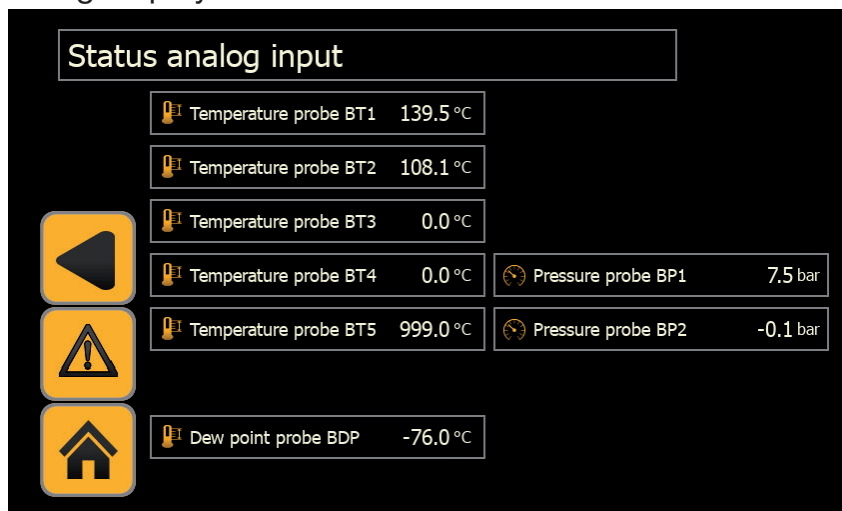
Display: digital input

- ▶ touch “Digital Output” .
Appear the following display:



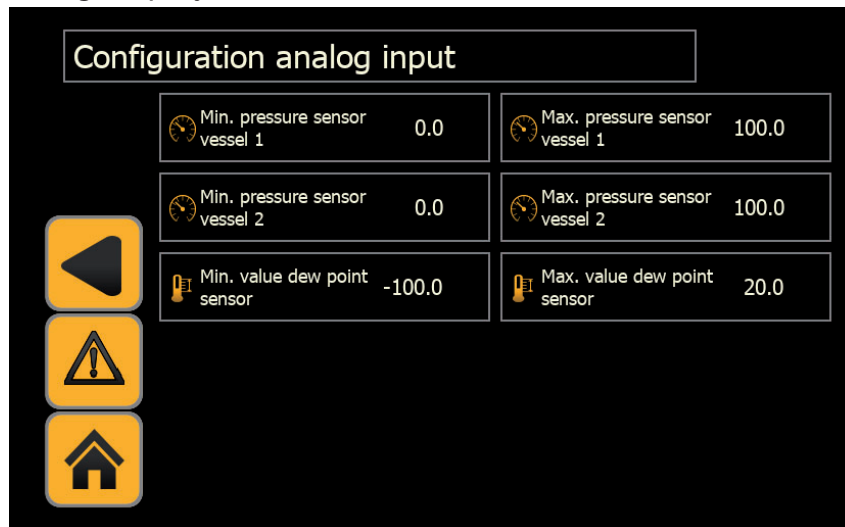
Display: digital output

- ▶ touch “Analogic input”.
- Appear the following display:



Display: ingressi analogici

- ▶ touch “Set Analogic input”.
- Appear the following display:

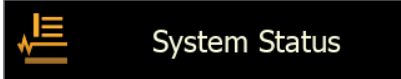


Display: analog input set

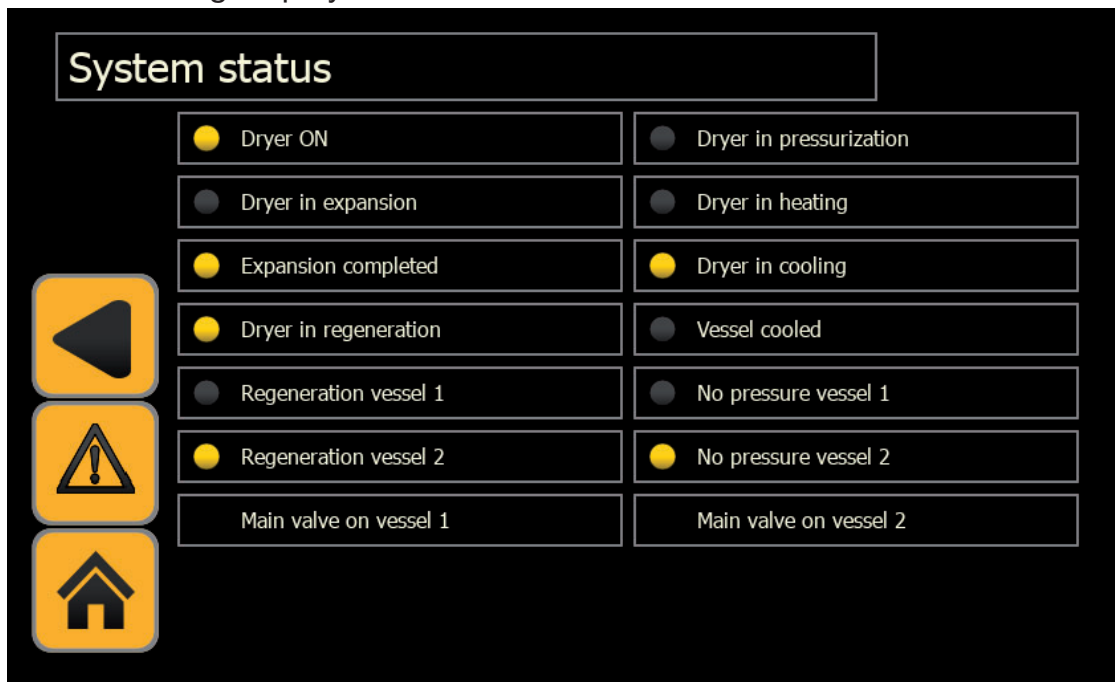
- ▶ On all these screens it is possible to see which inputs / outputs are enabled, and in particular in the case of analogue inputs it is also possible to see the value and set
- ▶ The parameters can only be configured by authorized service personnel.

7.6 Status System menu

► touch



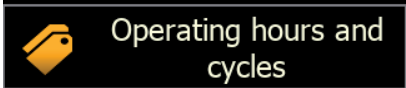
Appear the following display



Display: System Status

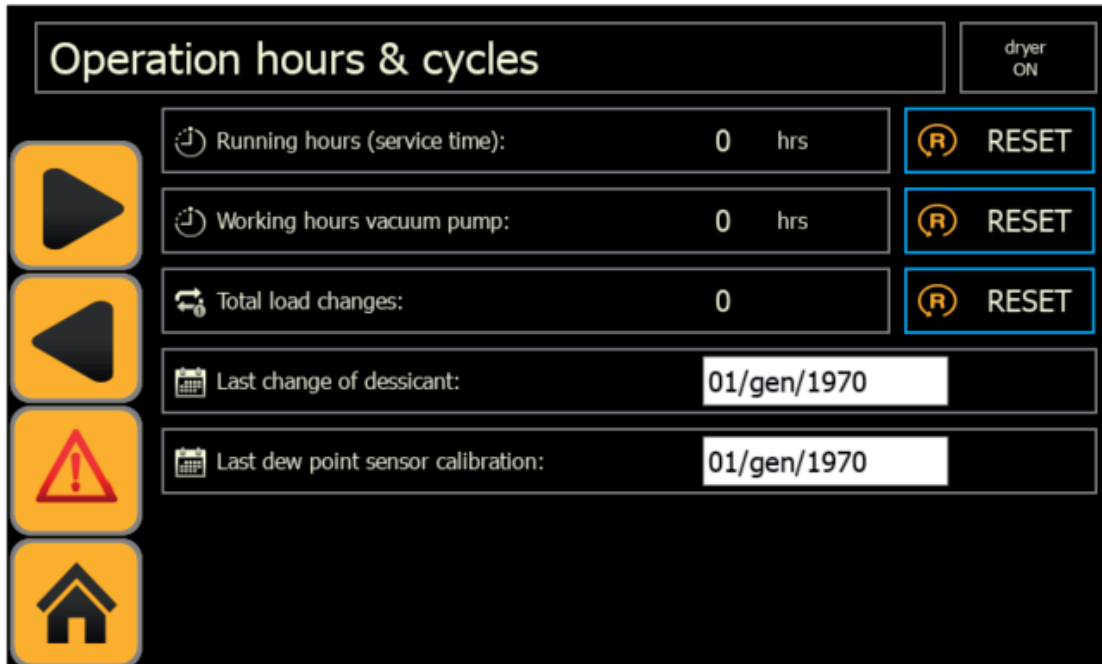
- Shows the current working status of the dryer in the two vessels

7.7 Menu work hours



▶ touch

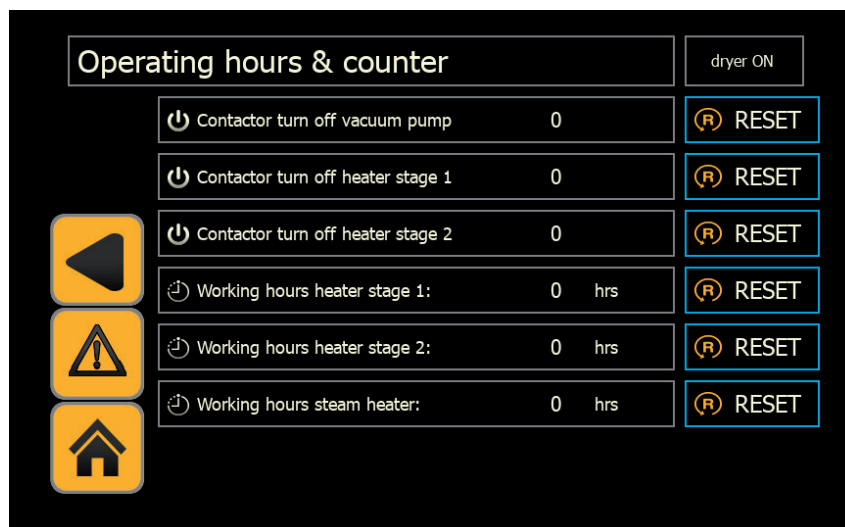
Appear the following display:



Display: Operating hours

Shows:


- ▶ The hours worked until the next maintenance
- ▶ Machine working hours
- ▶ the number of cycles performed
- ▶ The last time the dessicant was reloaded
- ▶ The last calibration performed of the dew point.
- ▶ The first three items can be reset.



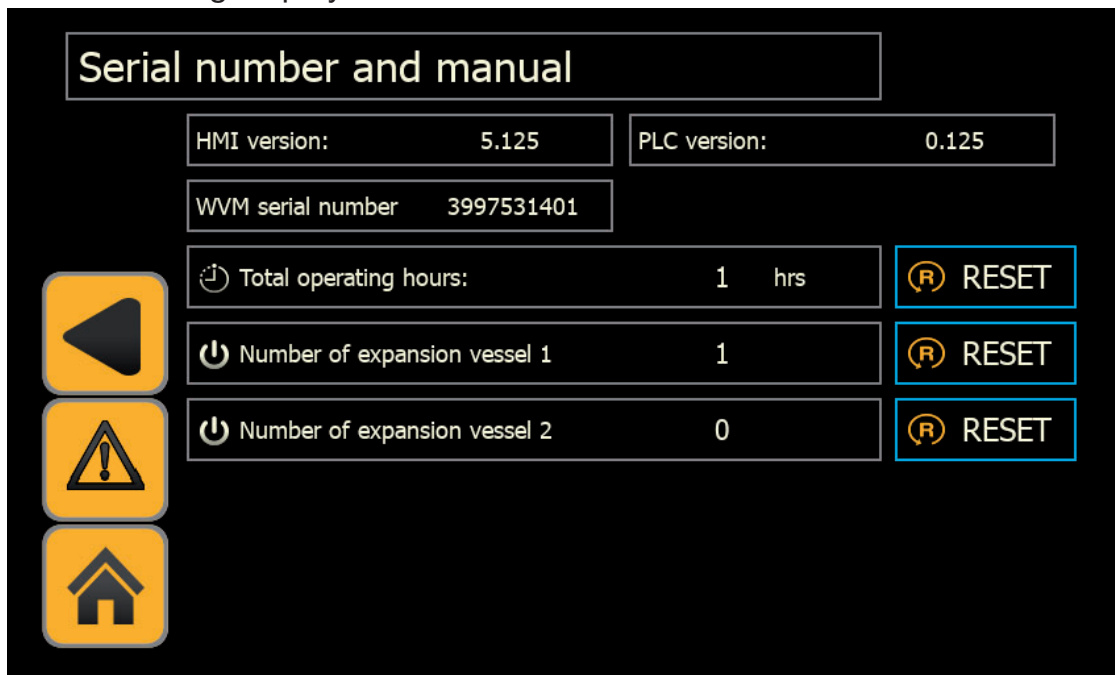
Display: ore lavoro(service)

- ▶ This display is only for Service personnel.

7.8 Menu serial number

▶ touch  Serial number and manual


Appear the following display:



Display: serial number

- ▶ the HMI version, the serial number and the PLC version
- ▶ total working hours
- ▶ the number of expansions on the vessel 1
- ▶ the number of expansions on the vessel 2
- ▶ On the last three items you can perform a reset.

7.9 Energy meter menu

- ▶ touch  Energy meter
- Appear the energy meter display:



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