

Operating Manual

ControX

Display and control module
(%O₂, ppm O₂, LOG O₂)

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1 ControX O₂ module

1.1 Start-up view

The “**language**” page enables you to choose the ControX interface language. It also displays the date and time as well as the version number currently installed.

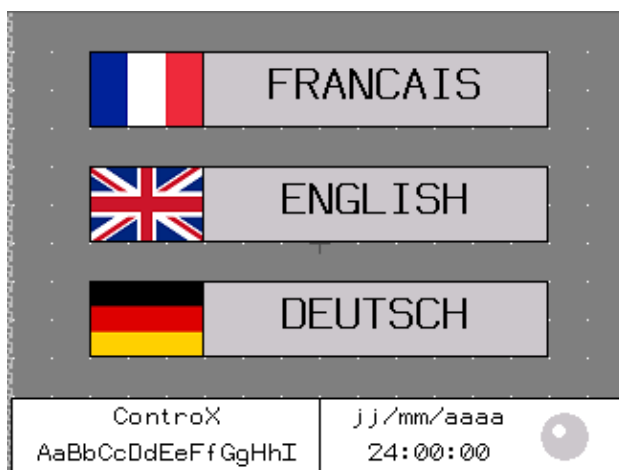


Fig 1: Main page, language selection and version number

You can click on each language, which takes you directly to the “home” page in the language specified.

Note: A green light is flashing when the system is running.

1.2 Main page

The **"Home"** button takes you to the main page of the ControX.

This main page displays the oxygen concentration (in %, ppm or log), the temperature (°C or °F) as well as the mV O₂ generated by the connected probe.

It also gives you access to the other pages of the interface.

LANGUAGE		SAVE
1234567.1 ppm		1234.1 mV
1234.1 °C		
Temperature setpoint	1234.1 °C	
ALARM	PARAMETERS	CURVE

* Temperature setpoint is shown only if "heated probe" option is used.

** Alarm is displayed in RED when at least one alarm is active.

Fig 2: Overview of the "Home" page

1.3 List of alarms

The **“Alarm”** button takes you to a page with all the alarms. Acknowledged alarms are in yellow and unacknowledged ones are in red. Inactive alarms are in green.

HOME		HISTORY		ACK ALARM	
	Date	Time	State		
▶	jj/mm/aaaa	24:00:00	XXXXXXXX	▲	
	XXXXXXXX			▲	
	XXXXXXXX				
	jj/mm/aaaa	24:00:00	XXXXXXXX		
	XXXXXXXX				
	XXXXXXXX				
	jj/mm/aaaa	24:00:00	XXXXXXXX		
	XXXXXXXX				
	XXXXXXXX				
				▼	
				▼	

Fig 3: Overview of the "Alarm" page

Tip:

To acknowledge all alarms, simply press on the orange **“ACK ALARM”** button when it flashes.

1.4 Alarm history

On the "History" page you can have an overview of all the alarms that have occurred in the past (inactive ones are in green).

HOME		ALARM		
Date	Time	State		
▶ jj/mm/aaaa	24:00:00	XXXXXXXX		▲▲
XXXXXXXXXX				▲
jj/mm/aaaa	24:00:00	XXXXXXXX		▲
XXXXXXXXXX				▼
jj/mm/aaaa	24:00:00	XXXXXXXX		▼
XXXXXXXXXX				▼▼

Fig 4: Overview of the "Alarm" page

1.5 Parameters

The "**Parameters**" page gives you access to all the ControX settings.

This page can be accessed from the Main "**Home**" page.

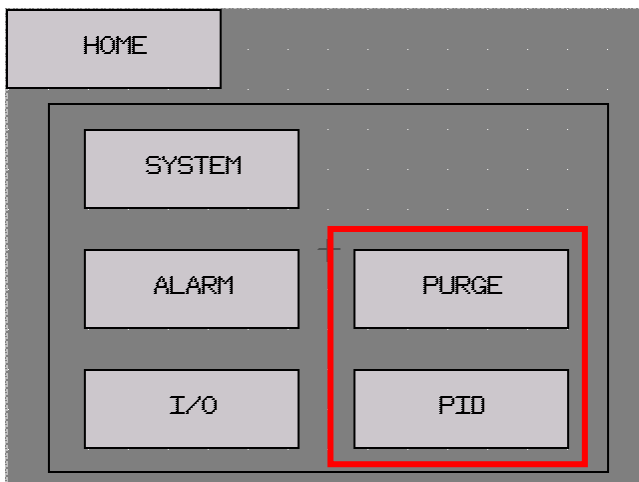


Fig 5: Overview of the "Parameters" page

***Purge** and **PID** are only displayed if the system is operating a heated probe.

** Views that have a lock (such as "I/O" and "PID") are password-protected.

You can click on each button to go to the corresponding parameter.

1.5.1 "System"

The "System" page shows all the parameters regarding the reference gas used, the pressure of the gas inside your kiln/furnace as well as parameters about the temperature measured by your probe.

	HOME	PARAMETERS
1	Reference gas P _{O2}	1.123
2	Measured gas pressure	1.1 bar
3	O ₂ correction (offset)	123.1 mV
4	Temp. correction (offset)	123 °C
5	O ₂ measure unit	Automatic
6	Temperature unit	°C
7	Heating probe	NO

Fig 6: Overview of the "System" parameters

- 1:** Partial pressure value of the reference gas. Always use 0.209 when air is used.
- 2:** Pressure value of the gas inside your kiln/furnace (in bar).
- 3:** Correction offset to be applied to the measured O₂ value (in mV).
- 4:** Correction offset to be applied to the measured temperature value (in °C).
- 5:** Choice of unit for O₂ measure. The "automatic" option continuously checks and chooses the best unit according to the value measured (% , ppm , or log).
- 6:** Choice of temperature range (°C or °F).
- 7:** Activation of the heating option for probes which require to be heated.

1.5.2 "Alarm"

The "Alarm" page shows all the settings regarding alarms.

	HOME	PARAMETER	
1	Wire break alarm time	1234 s	
2	Tolerance alarm time	1234 s	
3	Tolerance + temp. value	123 °C	
4	Tolerance - temp. value	123 °C	

Fig 7: Overview of the "Alarm" parameters

- 1:** Waiting time before an alarm is raised when a thermocouple wire break is detected.
- 2:** Waiting time before an alarm is raised when the tolerance setpoint has been exceeded.
- 3:** Maximum value of the tolerance area between the temperature measured and the set point.
- 4:** Minimum value of the tolerance area between the temperature measured and the set point.

1.5.3 "I/O", page 1

The "I/O" parameter page allows you to manage the analog inputs and outputs related to the O₂ content.

	HOME	PARAMETERS	→
1	Input min mV		1234 mV
2	Input max mV		1234 mV
3	Output min %		123 %
4	Output max %		123 %
5	Output min ppm		1234 ppm
6	Output max ppm		1234 ppm
7	Output min log		123.12 log
8	Output max log		123.12 log

Fig 8: Overview of the "I/O" O₂ related parameters

- 1:** Minimum scaling value, analog O₂ input
- 2:** Maximum scaling value, analog O₂ input
- 3:** Minimum scaling value, analog O₂ output, if unit = "%"
- 4:** Maximum scaling value, analog O₂ output, if unit = "%"
- 5:** Minimum scaling value, analog O₂ output, if unit = "ppm"
- 6:** Maximum scaling value, analog O₂ output, if unit = "ppm"
- 7:** Minimum scaling value, analog O₂ output, if unit = "log"
- 8:** Maximum scaling value, analog O₂ output, if unit = "log"

ControX has a 4 to 20 mA O₂ output, this means the minimum scaling value is equal to 4mA and the maximum scaling values is equal to 20 mA.

The black arrow takes you to the "I/O" parameter, page 2 concerning system temperature.

1.5.4 "I/O", page 2

The "I/O" parameter page 2 allows you to manage the analog inputs and outputs related to the probe temperature.

	HOME	PARAMETERS	←
1	Output min °C		1234 °C
2	Output max °C		1234 °C
3	Output min °F		1234 °F
4	Output max °F		1234 °F

Fig 9: Overview of the "I/O" temperature related parameters

- 1:** Minimum scaling value, analog temperature output, if unit = "°C"
- 2:** Maximum scaling value, analog temperature output, if unit = "°C"
- 3:** Minimum scaling value, analog temperature output, if unit = "°F"
- 4:** Maximum scaling value, analog temperature output, if unit = "°F"

ControX has a 4 to 20 mA temp. output, this means the minimum scaling value is equal to 4mA and the maximum scaling values is equal to 20 mA.

The black arrow takes you back to the "I/O" parameter, page 1 concerning system O₂.

1.5.5 "Purge" (CarboProbe™ LT only)

The "Purge" page gives you access to all the settings concerning the purging of a heated probe.

	HOME	PARAMETER	
1	Automatic		OFF
2	Manual purge		OFF
3	Purge time		1234 s
4	Stabilization time		1234 s
5	Interval time		1234 min

Fig 10: Overview of the "Purge" parameters

- 1:** Enables automatic purging of the CarboProbe™ LT
- 2:** Manual forcing of purge
- 3:** Purge duration
- 4:** Period post-purge during which the O₂ measure is frozen
- 5:** Period between two automatic purges

1.5.6 "PID" (CarboProbe™ LT only)

The "PID" page allows you to fine-tune all the PID data for the heater of the heated probe.

	HOME	PARAMETERS	
1	PID output value		123.1 %
2	Temperature setpoint		1234 °C
3	P. Kp		12.12
4	I. Ti		1234 ms
5	D. Tv		1234 ms
6	Ramp function		OFF
7	Gradient		1234 °C/min

Fig 11: Overview of the "PID" parameters

- 1:** Current value of the PID output (cannot be changed)
- 2:** Temperature set point, **CAUTION! This should be set into "°C" only!**
- 3:** Value of the "Proportional" action
- 4:** Duration of the "Integral" action
- 5:** Duration of the "Derived" action
- 6:** Enables the temperature "Gradient" function in order to limit heating acceleration
- 7:** Temperature rise acceleration value of the "Ramp" function

1.5.7 Access and user rights

In order to protect access to certain parameters, password protection is implemented.

There is 1 user level:

Level	Username	Password	Privileges
0	-	-	Basic display and configuration functions
1	admin	adm	Advanced display and configuration functions

Authentication log-in:

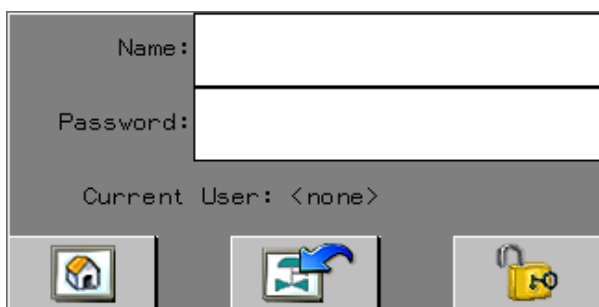


Fig 12: Login window

- Once the fields "name" and "password" are entered, press the lock to log in.
- The button with a house link on it navigates to the start-up page ("language" view).
- The button with a blue arrow navigates to the previous page ("settings" view).

CAUTION: Make sure Caps Lock is disabled.

To log in, enter the following credentials:

User Name: "admin"
Password: "adm"

1.6 Save


The “**Save**” page enables you to export the history of the last 10,000 measurement points recorded. They can be exported to a FAT 32 formatted USB key.

!! Do not switch off ControX before saving your data !!

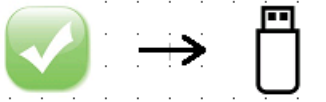
ControX does not have a hard disk so switching it off will erase data recorded in its memory. Make sure you always export them to the USB disk drive before turning ControX off.

As the sampling frequency is 1 record per minute, this represents approximately 1 week of entries.

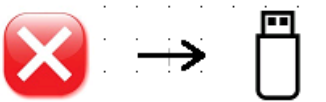


Insert a FAT 32 formatted USB key and press the  button to run the save procedure.

- A pop-up window appears, and a flashing green icon tells you that the operation is in progress.
- When the icon glows green, the saving is complete. An CSV file is created and copied to your USB key.



- If it turns red, then the save operation has failed (see the error on the screen for more information).



1.7 Oxygen curve

The "O₂ curve" page displays the last 60 O₂ measurements recorded by the system, if the system has not been turned off.

As the sampling frequency is 1 record per minute, this represents approximately 1 hour of recording.

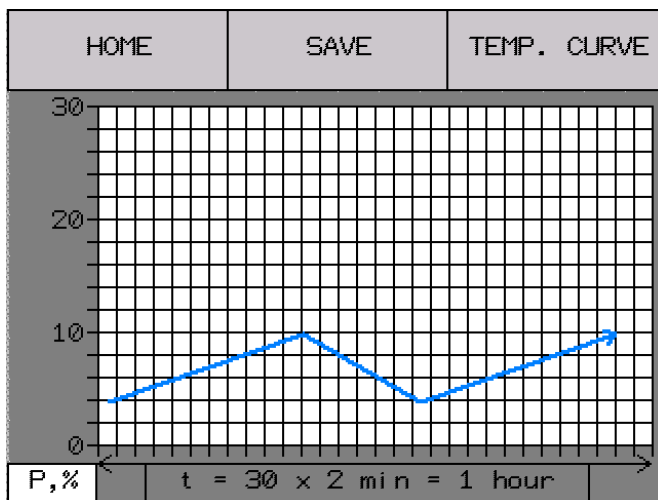


Fig 13: Overview of the "O₂ curve"

The scale of the graph adapts itself depending on the unit used (% , ppm or log). It also displays the units chosen in system settings.

1.8 Temperature curve

The “**Temp. curve**” page displays the last 60 temperature measurement points recorded by the system, if the system has not been turned off.

As the sampling frequency is 1 record per minute, this represents approximately 1 hour of recording.

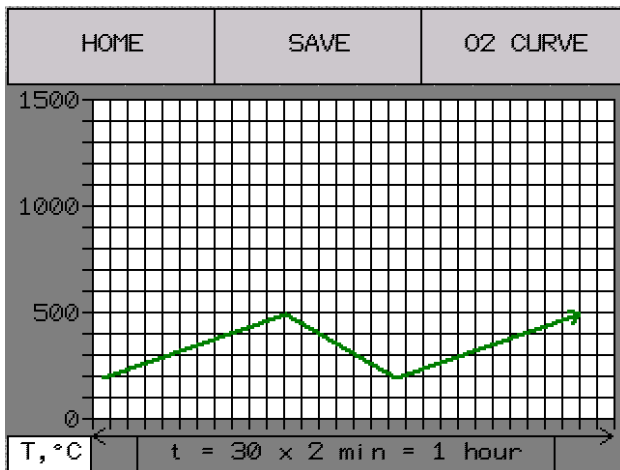
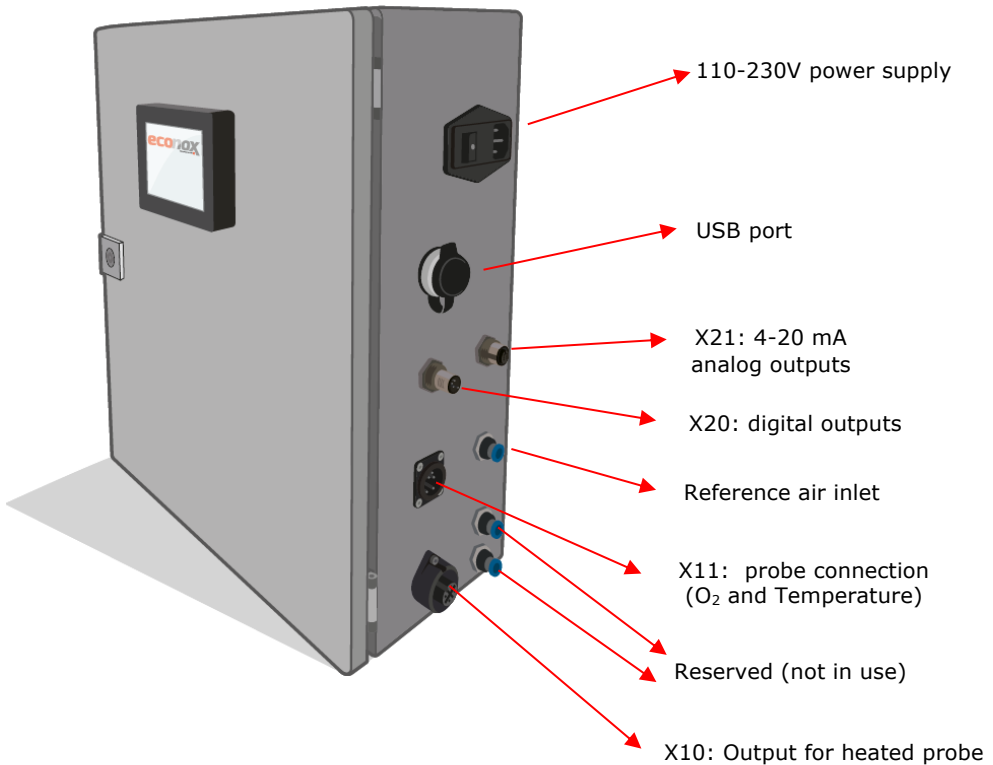


Fig 14: Overview of the "temperature curve"

The graph is displayed in the units chosen beforehand in system settings.

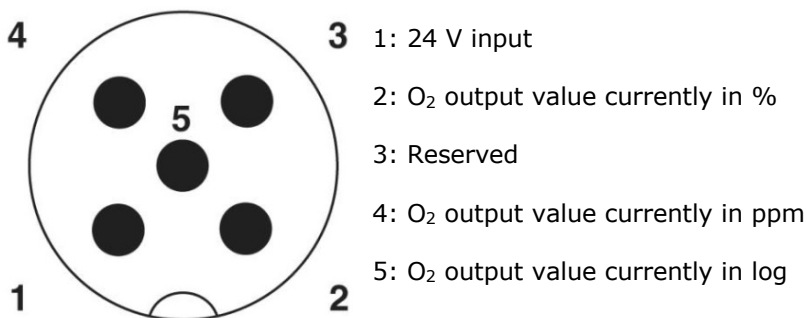
2 ControX box description

2.1 Details of ControX connectors

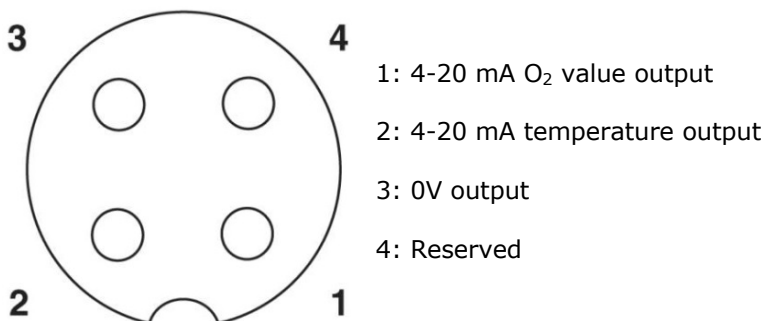


2.2 Connectors details

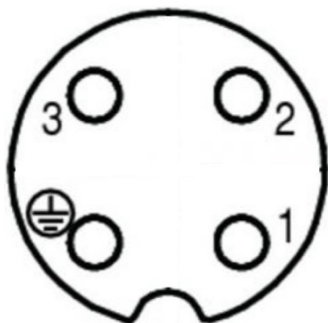
2.2.1 X20: Digital outputs



2.2.2 X21: Analog outputs

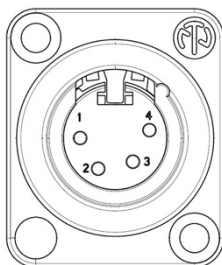


2.2.3 X10: Heated probe output



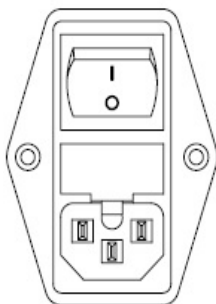
- 1: Heating output
- 2: Heating output
- 3: Reserved
- 4: Reserved

2.2.4 X11: O₂ value and thermocouple input



- 1: Thermocouple +
- 2: Thermocouple -
- 3: O₂ +
- 4: O₂ -

2.2.5 F1: 110-230V power supply

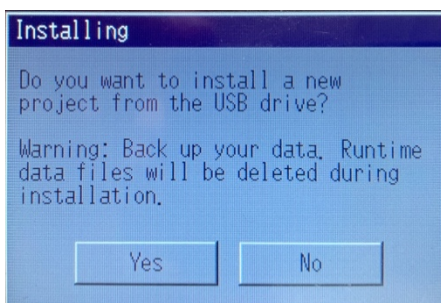


10A fuse, 50x20

2.3 Software update

Econox releases software updates to correct bugs or add functionality to the ControX box. Follow this procedure to update your ControX to the latest software:

- Make sure you have a FAT 32 formatted USB drive.
- Extract the zip file received from Econox or downloaded from the Econox.com website.
- Copy the files to the FAT 32 formatted USB drive.
- Plug it in the USB port located on the side of the ControX box and wait for the screen to show the following information:



- Click on "Yes" and wait a few minutes until your ControX is updated.

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