



User Manual

Sealing Module - ULISS

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Read this manual carefully before using the ULISS sealing module

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Glossary

PLC: Programmable Logic Controller

HMI: Human Machine Interface

LAS: Laboratory Automation System

CBS: Cryo Bio System

	See manual
	Please note: extra care required
	Not allowed

1. Safety instruction

1.1 General recommendations

The sealing module is commissioned by Cryo Bio System personnel.



Operating personnel must read this user manual before using the sealing module.



No repair, maintenance or alteration work should be carried out unless the sealing module has been SWITCHED OFF and all power has been cut. This situation must be maintained throughout the duration of the work.



Mechanical and/or electrical/electronic repairs should only be carried out by trained specialist personnel.



Use only parts supplied or designated by Cryo Bio System. If other parts are used, the user of the sealing module will be responsible in the event of an incident.



The internal settings/parameters of the various components of the sealing module may not be modified without written authorization from Cryo Bio System.



No modifications (mechanical or electrical) may be made to the any part of the sealing module without written authorization from Cryo Bio System.



Do not alter, disable or remove safety devices.

1.2 Recommendations/Risks related to use of the device

Use of the sealing module is restricted to the interior of a laboratory automation system. Under no circumstances may be it used in a standalone manner, and it must be used by an operator trained in its operation and the associated risks.

To guarantee safety when using the module, please follow these instructions:









- This module is constructed to seal only the following specific Cryo Bio System tubes: High Security Tubes ref. 022251, ref. 022252, ref. 023722, and ref. 029640.
- No unspecified object should be allowed to interfere with the module.
- Do not modify/disassemble/alter the module in any way.



If the module is used outside these limitations, its level of protection cannot be guaranteed.

This manual includes safety instructions to protect the user and prevent damage to the module. These instructions are classified according to the table of warnings. The logos below may be found in this manual and on the module.

Read the safety instructions carefully before using the module!

Warning	Symbol	Danger area	Safety instruction
Entrapment hazard		Between heating blocks	Do not put your fingers into the sealing area during use
Burn hazard		Heating blocks High temperature ~145 °C	Do not put your fingers into the sealing area during use
Burn hazard		Casing around sealing area High temperature ~40 °C	Avoid any contact with the surface close to the sealing area
Electrical hazard		Electrical box	Do not perform any maintenance inside the unit when the module is switched on
Noise hazard		Environment close to the module	Noise less than 70 dB
Heavy object hazard		Packaging of whole module	Avoid handling the packing box alone
PPE must be worn		Heating blocks High temperature ~135 °C	The wearing of appropriate PPE (heat protective gloves) when handling the heating blocks
PPE must be worn		Packaging of whole module and/or control box alone	Suitable PPE (safety shoes) must be worn when handling parts

1.3 Safety of property and persons

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Protection for persons is provided by the glazed door on the laboratory automation system. Sealing and movement are interrupted by a safety sensor when the glazed door of the laboratory automation system is opened.

If the alarm is triggered, sealing can only restart once the laboratory automation system door has been closed and the module has been reset (see 5.2 Initialization procedure).



The module's safety sensor must be fitted to the laboratory automation system's protective glass and connected to the module's electrical box prior to any use.

1.4 Residual hazards and risks

The sealing module and all other components of the system comply with the currently valid safety regulations. Nevertheless, even if all the instructions are followed, it is not possible to rule out all risks during use; an incident external to the sealing module or a manufacturing defect in a mechanical/electrical part may cause the sealing module to act unexpectedly/dangerously.

As a result, users must:

- Have been trained in the use of the device,
- Always be vigilant when in the vicinity of the sealing unit.



The power supply socket must be accessible and easily identifiable to allow the power supply to the sealing module to be disconnected in the event of danger.



Avoid any direct prolonged eye contact with the LED strip if the casing / diffuser is not present.

1.5 Scope of the guarantee

Cryo Bio System shall not be held responsible for any failure to comply with the instructions in this user manual.

The operational safety of the sealing module is only guaranteed if it is used in accordance with the instructions in this manual and in the accompanying manuals of the various manufacturers.

Operation according to all these recommendations also includes observing the start-up and shutdown procedure as well as the maintenance and servicing regulations.

Cryo Bio Technologies cannot be held liable for any resulting damage in the event of other uses not corresponding to these recommendations.

2. Unpacking the sealing module



A sealing module that has been dropped or suffered an impact must not be used. It could cause mechanical and/or electrical safety hazards.

Carefully unpack the sealing module and check that all the parts listed in the packing list are present.

The packing case must be kept for all future movements (moving to another production site, After Sales Service maintenance at Cryo Bio System, etc.).

Packing list

IMV Reference	Description	Quantity
029530	ULISS	1
029761	USER MANUAL	1

3. General Description

3.1 Introduction

The sealing module is a semi-autonomous system (must be integrated into a laboratory automation system) used to seal two CBS High Security tubes simultaneously and hermetically. It comprises two sub-assemblies:

- The sealing module, comprising:
 - The frame (A – See Figure 1)
 - The transfer table (B – See Figure 1)
 - The heating blocks (C – See Figure 1)
 - The casing (D – See Figure 1)
 - The special laboratory automation system adaptor plate (E – See Figure 1)
- The control box (F – See Figure 2)

3.2 Overview

A snapshot of the two sub-assemblies is given below:

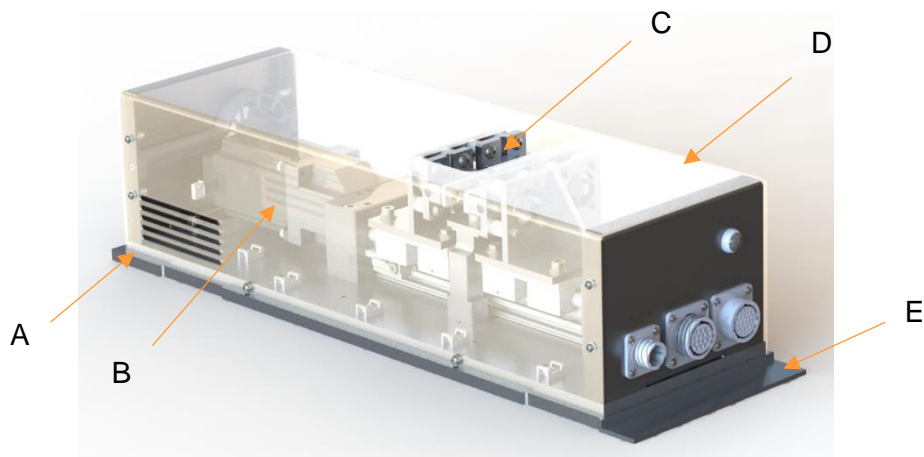


Figure 1: Sealing unit with casing shown as transparent (without control box)



Figure 2: Sealing unit and control box

3.3 Module dimensions and characteristics

	Sealing module	Control box
Dimensions W x D x H (in mm)	468 x 153 x 116	482.6 x 177 x 425
Mass (in kg)	5 kg	12 kg
Supply voltage (in V)	230 V \pm 10%	
Frequency (in Hz)	50 Hz	

3.4 Equipment nameplate

The equipment's nameplate gives full production details and information about each sealing module. It is secured to the rear of the control box.



Figure 3: Machine identification nameplate

3.5 Associated consumables

The module has two associated consumables:

- CBS High Security tube
- Module sealing jaws

Below is a snapshot of a CBS High Security tube for sealing (CBS references according to packing: ref. 022251, ref. 022252, ref. 023722, ref. 029640). The sealing area is located on the upper part of the tube (see figures below):



Figure 4: Tube for sealing

Sealing area:

Recommended height: 43 mm

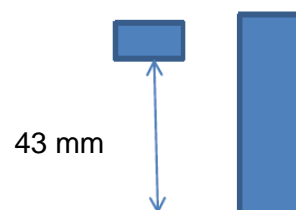


Figure 5: Weld height

The consumable part of the heating block (sealing jaws) comprises the anvil and the cover. These two parts are secured using screws. This consumable is held in position on the block by magnets, allowing it to be easily removed for maintenance.

The sealing jaws should be changed periodically according to the customer’s end use and the amount of processing wear to the anvils (green section on figure above); Cryo Bio System recommends changing the sealing jaws a minimum of once every 5000 cycles.

Every sealing module has four sealing jaws, allowing two CBS High Security tubes to be sealed simultaneously.

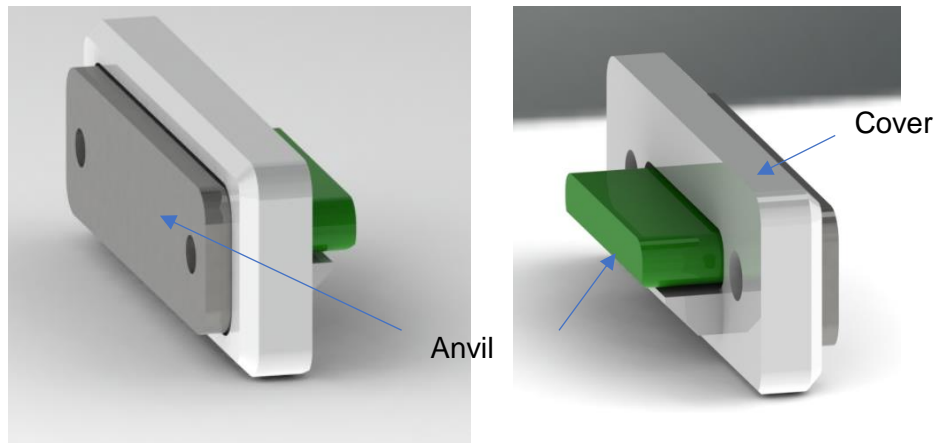






Figure 6: Heating block consumable parts

3.6 Connectivity

General power supply	Use a power supply cord capable of carrying 10 A at 250 V.
Ethernet cable	Connection for category 5 Ethernet cable only
PLC input/output cable	Connecting cables for an SELV circuit (60 V DC max, 30 V RMS max)

4. Installation

	<p>Before performing any electrical maintenance, you must make sure that the sealing module's power connector is unplugged. Carefully check the supply voltage shown in this document. It must be identical to that of your network.</p>
	<p>Before performing any maintenance, carry out a visual check of the integrity of all components.</p>
	<p>Before performing any maintenance, check the temperature of heated elements (casing, heating blocks).</p>
	<p>Suitable PPE (safety shoes) must be worn when handling the different parts.</p>

4.1 Handling points

Once secured to the adaptor plate specific to the laboratory automation system, the welding module must be handled using the handholds shown in Figure 7, below:



Figure 7: Sealing module handling point

Once removed from the packing box, the control box can be easily handled from underneath (feet allowing room for the fingers to pass under it when put down).



Figure 8: Control box handling point

4.2 First installation

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4.2.1 Electrical system installation requirements

Safety related to the use of this machine must be connected electrically to a compliant electrical system (NFC 15-100 for France), featuring, among other things, grounding that is correctly protected against insulation defects.

The power cord must be in perfect condition. If there is any visible defect, replace with a cable of equivalent cross-section.

Overvoltage category	CAT II	Operating altitude	< 2000 m
Max amperage	10 A	IP index	Undeclared
Wire cross-section	3G0.75	Ambient humidity	< 90%
Connector type	IEC C13 to PCCEE7	Ambient temperature:	25 °C
Pollution degree rating:	Pol. 2		



**The power supply socket must be accessible and easily identifiable to allow the power supply to be disconnected in the event of danger.
The cutoff device must be provided in the final installation.**

4.2.2 Installation procedure

- Unpack the module and keep the box;
- Secure the sealing module to its LAS adaptor plate;
- Install the sealing module in its position within the LAS;
- Install the control box: close to the LAS, ideally in a horizontal position;
- Connect the different communication cables between the control box and the sealing module (see Figure 9);
 - o Motor cable (Cable W4)
 - o Encoder cable (Cable W5)
 - o Module elements cable (Cable W2)
- Connect the communication cable between the LAS and the sealing module control box (Cable W3 – see Figure 9);
- Position the safety sensor permanently on the LAS glazed door;
- Connect the safety sensor to the module control box (Cable W1 – Figure 9) (SELV port)
- Connect the equipment using the power supply cord to the power outlet provided for that purpose. **Warning: 230 V present on port!**

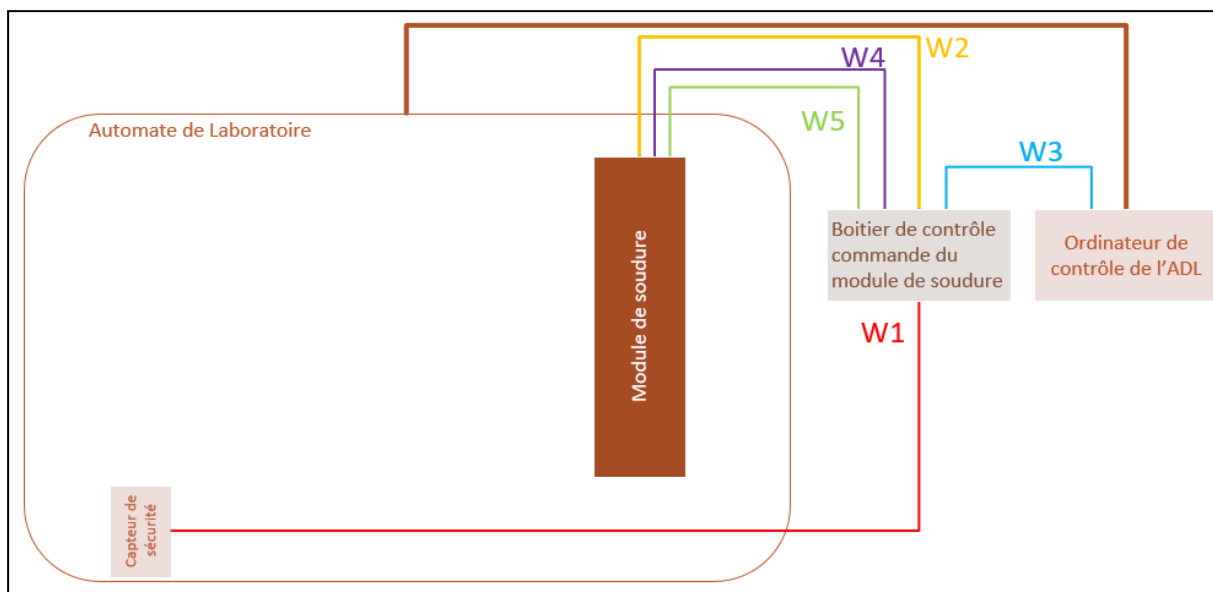







Figure 9: Simplified wiring diagram

5. Operating procedure

5.1 List of module states

The color code used to describe module states is defined as follows:

<p>Blue steady</p> 	<p>Module on and awaiting initialization, or eco mode</p>
<p>Green steady</p> 	<p>Module operating</p>
<p>Red steady</p> 	<p>Module fault or maintenance request</p>
<p>Magenta flashing</p> 	<p>Jaw maintenance alert (number of cycles \geq defined alarm value); the module can continue sealing.</p>
<p>Magenta steady</p> 	<p>Jaw maintenance fault (number of cycles = defined fault value); the module cannot continue sealing.</p>

Module status LED

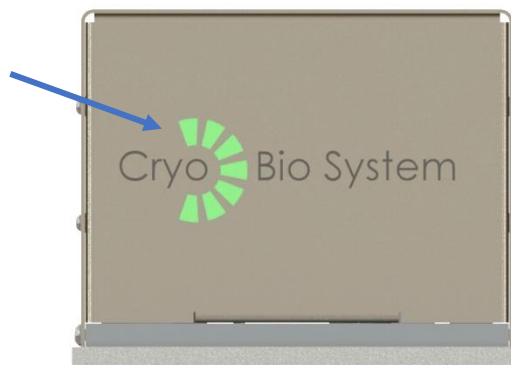


Figure 10: Front of module

5.2 Initialization procedure

First, to launch initialization, the system and wiring must have been completed by a trained technician (see chapter 4.2 First installation, above)

Initial conditions:

The module is awaiting initialization, the LED strip is Blue.



Permanent conditions:

The module is on, no faults.

Cycle description:

- Initialization request from robot.
- Table position reset: the motor operates counterclockwise up to the zero position, detection is activated by the end position sensor.
- Heating blocks heated to 140 °C on the active surface of the anvil.
- The module is initialized, the reference temperature and position are reached.
- LED strip changes to Green.

5.3 Cycle launch procedure

To launch a sealing cycle, initialization must first have completed correctly, with the LED strip on the sealing module therefore showing Green (see chapter 5.1 Initialization procedure, above).

The heating block anvils will exert a pressure on the CBS High Security tubes according to the sealing position reached. The temperature of 135 ± 1 °C on the external surface of the tube allows sealing in a time of 7 seconds. The anvils will then retract and allow the tubes to cool.

Initial conditions:

The module is initialized; the LED strip is Green



Permanent conditions:

The module is on, no faults.

Cycle description:




- Gripper inserts and deposits tubes in the holder.
- Gripper retracts.
- Motor operates in the counterclockwise direction to reach the sealing position.
- Wait 7 seconds.
- Motor operates in the clockwise direction to reach the initial position.

Final action:

- Tubes removed by the gripper.

5.4 Managing faults in the sealing module

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Fault name	Description	Troubleshooting instruction	Module state
Module fault	Fault in cycle execution	<ol style="list-style-type: none"> 1. Check the state of the module 2. Acknowledge the fault on the LAS HMI 3. Reset the module on the LAS HMI 4. If this does not rectify the situation, reach out to maintenance 	Red steady 
Maintenance alert	The module has reached the maintenance level one	<ol style="list-style-type: none"> 1. Change the sealing jaws (see 8.3.1 Jaw replacement) 2. Reset the module on the LAS HMI 	Magenta flashing 
Maintenance fault	The module has reached the maximum number of cycles without maintenance. Carry out maintenance to be able to perform sealing.	<ol style="list-style-type: none"> 1. Change the sealing jaws (see 8.3.1 Jaw replacement) 2. Acknowledge the fault on the LAS HMI 3. Reset the module on the LAS HMI 	Magenta steady 

5.5 Eco mode

Eco mode is used to switch off power to the heating elements and the motor, thus reducing power consumption by the module during its inactive phases.

Activated by the maintenance technician from the “Maintenance” tab on the module’s HMI, this mode switches the module to the “awaiting initialization” state after being inactive for a certain period of time (adjustable at initialization).

Exiting eco mode is managed automatically by the laboratory automation system.

6. Module navigation

6.1 Login and access levels

Connection to the PLC is via a web browser at the following IP address:

IP address: <https://192.168.1.199>

Login	Password
Operator	
Technician	Level 1 password
Manufacturer	Level 2 password

Passwords are configured by Cryo Bio System on leaving the factory; reach out to your usual contact person if they have been forgotten.

Access level

	View Homepage	Control Homepage	Maintenance	Settings HMI	List of alarms	List of inputs / outputs
Manufacturer		X	X	X	X	X
Technician		X		X	X	X
Operator	X			X	X	X

6.2 Display homepage

The screenshot shows the HMI display homepage. At the top, it displays 'Access level : None' and the Cryo Bio System logo. The main area contains an 'External module control simulation' panel with status indicators (Waiting for initialization, Welding, Default, Module ready, End of cycle, Maintenance) and control buttons (Initialization, Welding, Abord, Clear defaults, Acquit Cycle). To the right, there are temperature readouts (0.0 / 145°C) and a 'Back' button. At the bottom, there are navigation icons for Login, Maintenance page, Alarms page, and List of inputs / outputs. A callout box labeled 'Access restricted' points to the top left corner of the display.

Figure 11: Display homepage

6.3 Control homepage

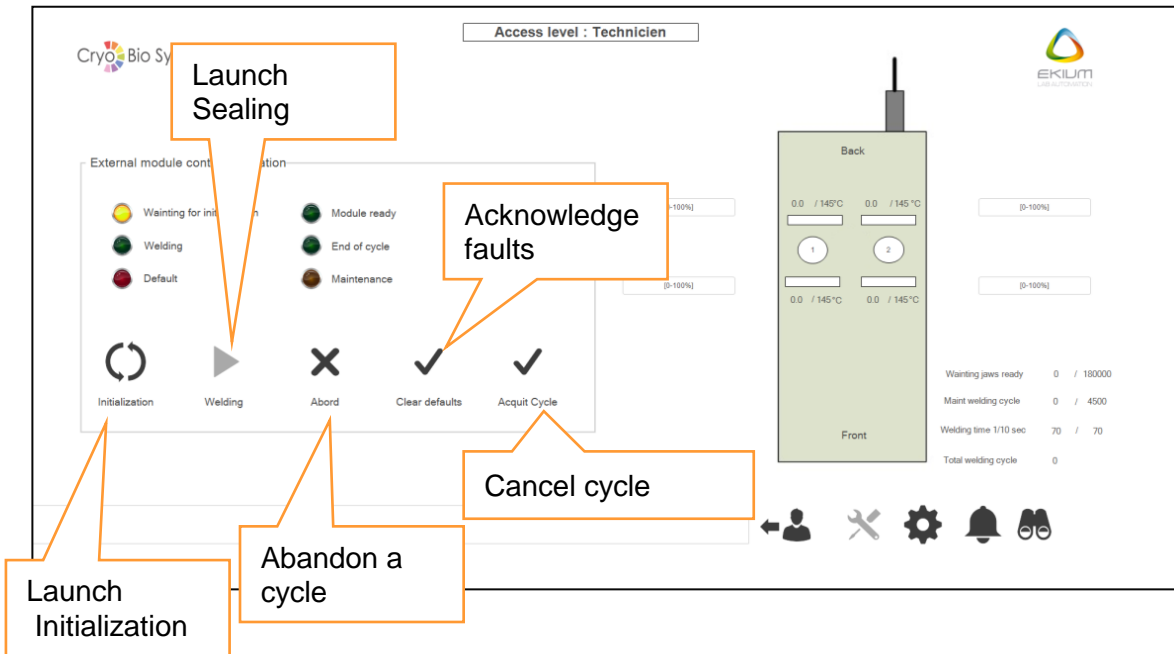



Figure 12: Control page

6.4 HMI settings page

To access the settings page, click on this icon: 

The settings page is used to switch the interface language: to French or to English. It also displays the current program and WAGO (PLC) and IGUS (movement table) firmware versions.

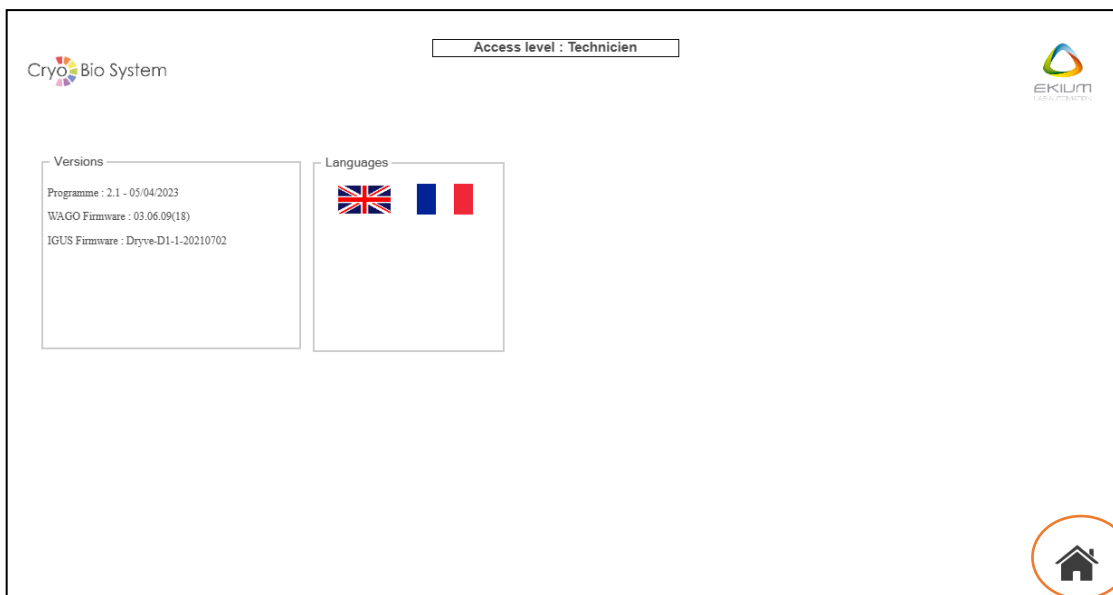



Figure 13: Settings page

Back to Display or Control page.

6.5 Alarms page

To access the list of alarms, click on the  icon from the module HMI.

It is also possible to acknowledge module faults from the HMI on the laboratory automation system.

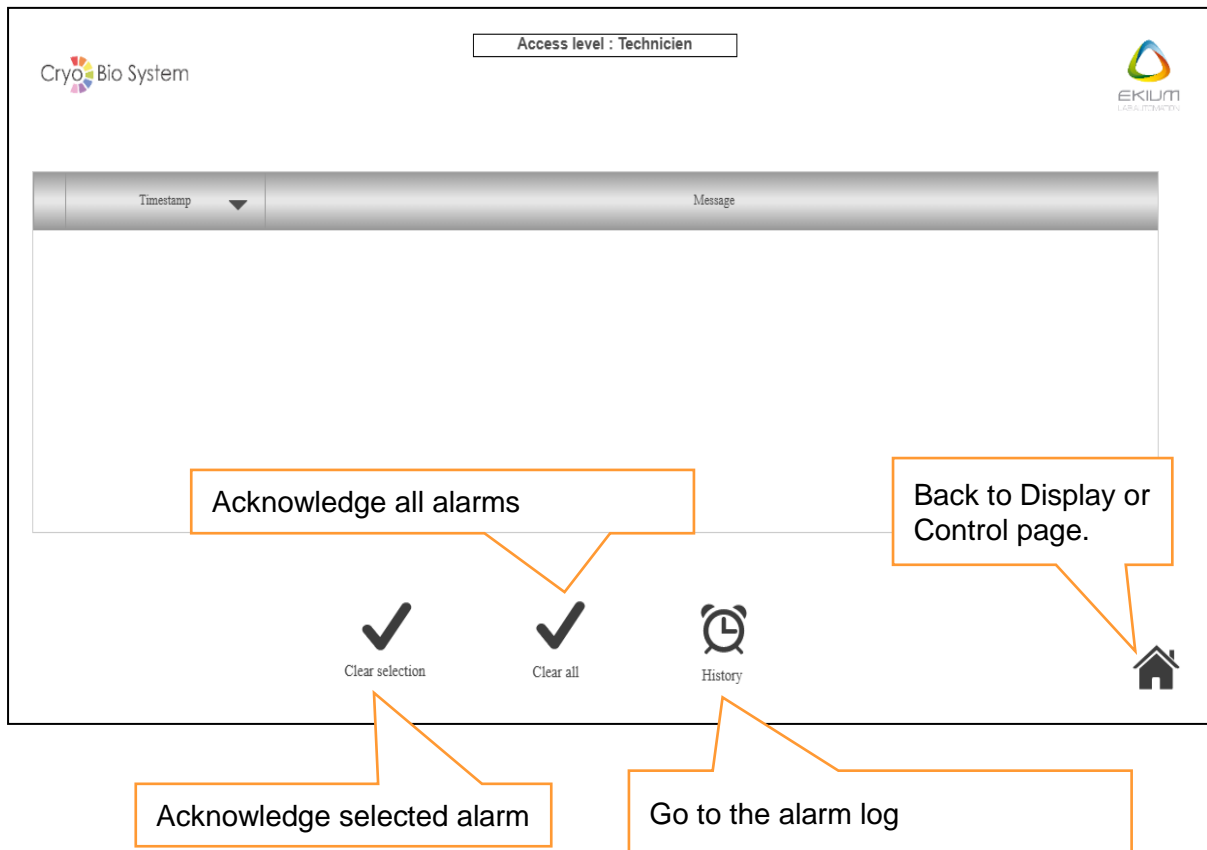


Figure 14: Alarms page

6.6 Inputs/Outputs page

To access the “Inputs/outputs” page, click on this icon:







Figure 15: Inputs/Outputs page

7. Diagnostic help - List of module faults

The appearance of any fault in the following list will change the state of the LED strip.

Fault name	Description	Troubleshooting instruction	Module state
Front 1/2 or Rear 1/2 heating element temperature too high	Temperature above max defined threshold (e.g.: 160 °C)	<ol style="list-style-type: none"> 1. Check the temperature sensor connections and correct the fault. 2. Acknowledge the fault and reinitialize the module. 	Red steady
Front 1/2 or Rear 1/2 heating element temperature too low	Temperature below min defined threshold (e.g.: 120 °C)	<ol style="list-style-type: none"> 1. Check the heating element connections and correct the fault. 2. Check the temperature sensor connections and correct the fault. 3. Acknowledge the fault and reinitialize the module. 	Red steady
IGUS card fault	IGUS card malfunction	<ol style="list-style-type: none"> 1. Connect to the IGUS interface, check the fault on the IGUS HMI and correct the fault. 2. Acknowledge the fault on the module HMI and reinitialize the module. 	Red steady
Emergency stop	LAS door opened	<ol style="list-style-type: none"> 1. Close the LAS door 2. Acknowledge the fault. 	Red steady
Short-circuit, overload	HS fuse	<ol style="list-style-type: none"> 1. Replace the affected fuse (see 8.3.3 Replacing a fuse) 2. Acknowledge the fault and reinitialize the module. 	Red steady
Maintenance alert	Cycle number \geq defined alarm threshold	<ol style="list-style-type: none"> 1. Replace the sealing jaws (see 8.3.1 Jaw replacement) 2. Acknowledge the alert and reinitialize the module. 	Magenta flashing
Maintenance fault	Cycle number = defined fault threshold, fault state activated	<ol style="list-style-type: none"> 1. Replace the sealing jaws (see 8.3.1 Jaw replacement) 2. Acknowledge the fault and reinitialize the module. 	Magenta steady
PLC fault	Front 1/2 or Rear 1/2 PT1000 channel fault	<ol style="list-style-type: none"> 1. Check the probe connections. 2. If necessary replace the PT1000/heating element assembly. 3. Acknowledge the fault and reinitialize the module. 	Red steady

8. Care and Maintenance

	Before performing any maintenance, switch off the welding module and the LAS.
	Before performing any electrical maintenance, you must make sure that the control box power connector is unplugged.
 	Before any handling of the sealing jaws, you must wait for their temperature to fall (estimated time 15 minutes after the end of a sealing cycle). If that is not possible, you must wear appropriate PPE (heat resistant gloves).

8.1 Maintenance schedules

Maintenance can only be performed by a trained technician who is aware of the risks of handling the sealing module outside the LAS environment.

To extend the service life of the sealing module, you are recommended to perform the following actions on a regular basis:

Every 2500 cycles	Check the condition of the jaws (see procedure 8.3.1 Jaw replacement)
Every month	Check the safety chain (triggering of the LAS door sensor)
Every 6 months	Perform preventive maintenance

8.2 List of replacement parts and associated consumables

Table 1: Replacement parts

CBS item code	Description	Quantity per module
029775	Sealing jaws	4
029776	CBS High Security tube holder	1
001046	DELAYED FUSE 5X20 4 AMP	2

Table 2: Associated consumables

CBS item code	Description	Quantity per bag
029640	CBS High Security non sterile tube	500
022251	Non sterile CBS High Security tube	100
022252	CBS Sterile High Security tube	20 (2x10 blister)
023722	CBS Sterile High Security tube	50

8.3 Preventive maintenance procedure

8.3.1 Jaw replacement

- Without removing the protective case from the machine, remove the 4 sealing jaws from their heating block (magnetic assembly – no tools required).
- For each jaw, check for any damage to the Teflon coating (green area).

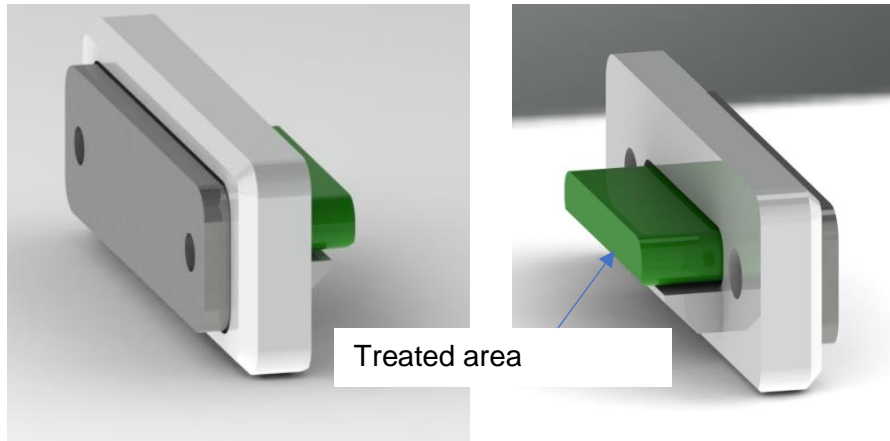


Figure 16: Sealing jaw – inspection area

- If necessary, change the sealing jaws.
- Reset the cycle counter by pressing (3 seconds) the RESET button on the back of the sealing unit.
- Acknowledge the fault on the HMI if the module was showing a maintenance alert or fault.

Cryo Bio System recommends changing the 4 sealing jaws as a matter of course after 5000 cycles to guarantee fully hermetic sealing.

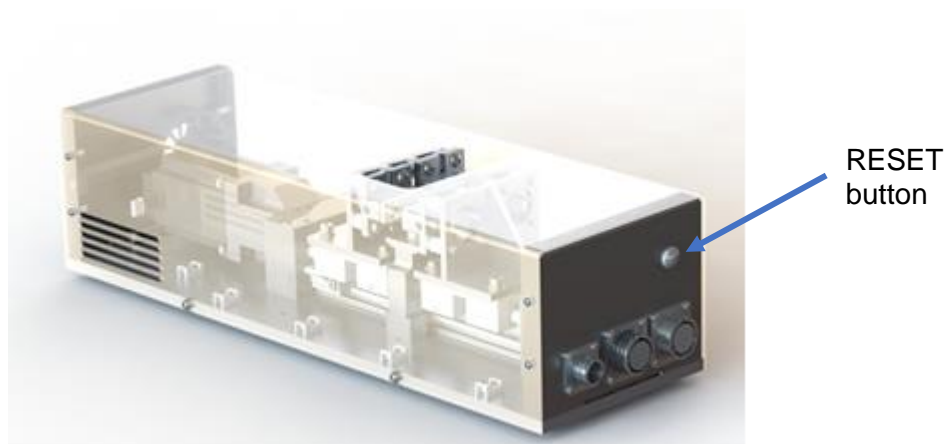


Figure 17: RESET button location

8.3.2 Cleaning and decontamination of the module

8.3.2.1 External surfaces

Frequency: according to the protocol in force in the laboratory.

Procedure: clean the sealing module with soapy water (e.g. lightly dampened sponge) or with alcohol wipes.



No cleaning with chlorinated agents, acids or bases.



8.3.2.2 External surfaces

In the unlikely event of a tube's contents being spilt (following incorrect robot pickup, impact with platform etc.), the CBS Tube Holder is designed to hold the equivalent of 2 mL of liquid.

This part is held in place by magnets to the module frame; it is easily accessible and removable by the operator.

Procedure:

- If necessary, acknowledge the fault on the platform HMI and release the gripper if it is in the sealing area;
- Open the LAS door;

	<p>Before any handling, you must wait for the sealing jaw temperature to fall (estimated time 15 minutes after the end of a sealing cycle).</p>
	<p>If that is not possible, you must wear appropriate PPE (heat resistant gloves)</p>

- Retract the 4 sealing jaws;

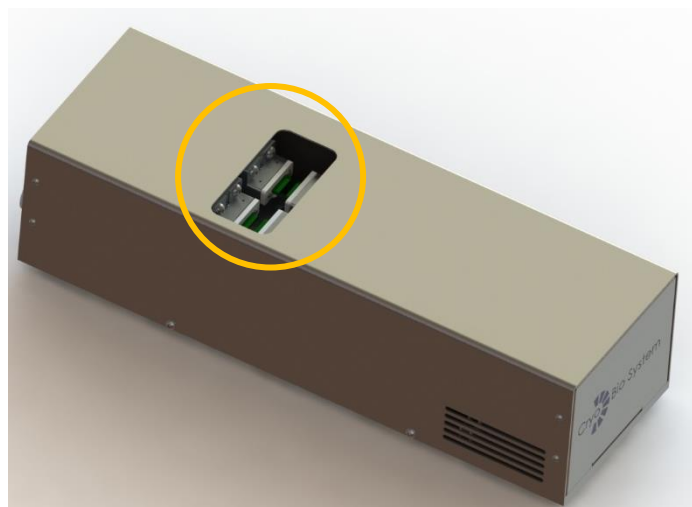
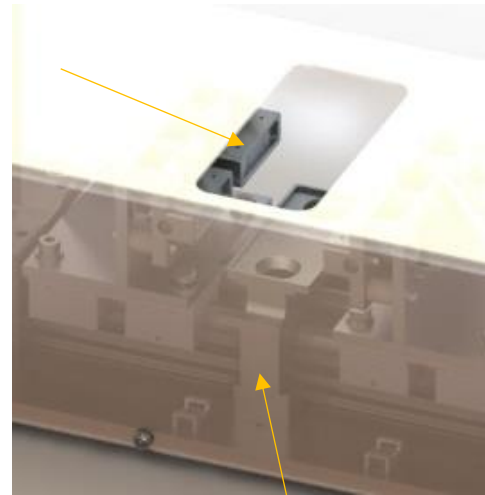


Figure 18: Sealing area

- Extract the CBS Tube Holder;

Jaw position after retraction



CBS Tube Holder

Figure 19: Transparent view of the module for CBS Tube Holder removal

- Outside the LAS proceed with emptying the Tube Holder, check its integrity and clean it with a disinfectant wipe. Replace the Tube Holder if it shows signs of deformation or significant impact (see 8.2 List of replacement parts and associated consumables);
- Put the Tube Holder back in position in the sealing module;
- Replace the 4 sealing jaws;
- Close the LAS door;
- Acknowledge the fault on the HMI and reinitialize the module.

8.3.3 Replacing a fuse

For your personal safety, and that of the equipment, ULISS is equipped with fuses to prevent any short-circuit and overheating of its components.

Should there be a fault, no specific message will appear on the module's HMI.

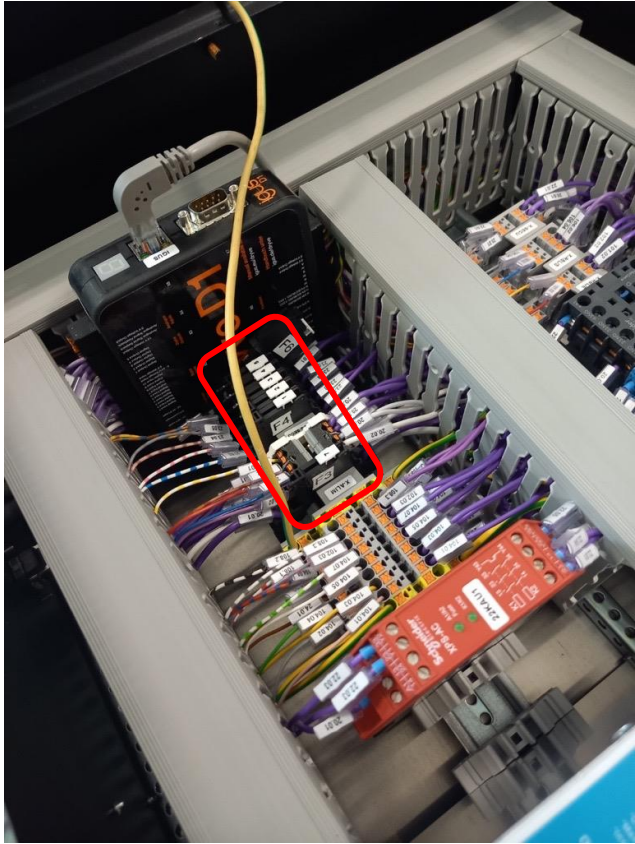
- If the module and the ON/OFF button on the rear do not light up, check the 2 fuses that can be accessed via the rear of the control box. Replace them if necessary: see 8.2 List of replacement parts and associated consumables.

IMV ref.	Description	Tag	Qty per module	Location
001046	Time-based fuse 4 A 5 x 20 mm type T 250 V AC	F1 & F2	2	

- If this does not solve the problem, reach out to the Cryo Bio System after-sales service

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- The sealing module is also equipped with the following fuses, located and identified inside the control box :

Description	Tag	Qty per module	Location
Miniature Fuse, 5 x 20 mm, Time-Lag T, H, 250 VAC, UL: 115 V - 300 VDC - 12.5 A	F3	1	
Miniature Fuse, 5 x 20 mm, Medium-Time-Lag M, 250 VAC 3.15A	F4	4	
Miniature Fuse, 5 x 20 mm, Medium-Time-Lag M, 250 VAC, 1.6A	F5 et F6	2	

- In case of failure, those fuses must be replaced by a trained Cryo Bio System after-sale technician.



Do not open the control box without authorisation

9. Technical specifications

9.1 General dimensions

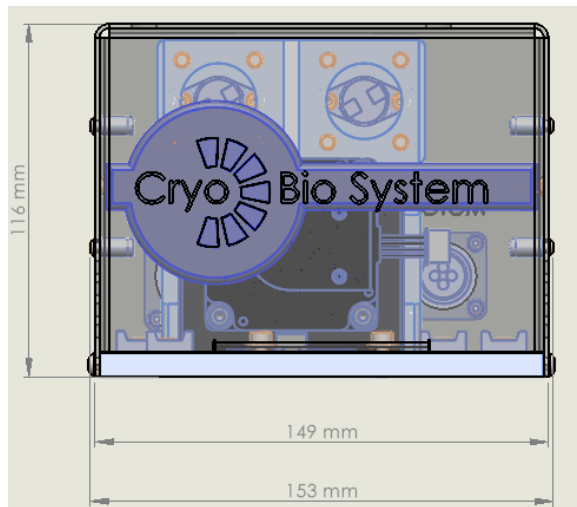


Figure 20: Front view of sealing module

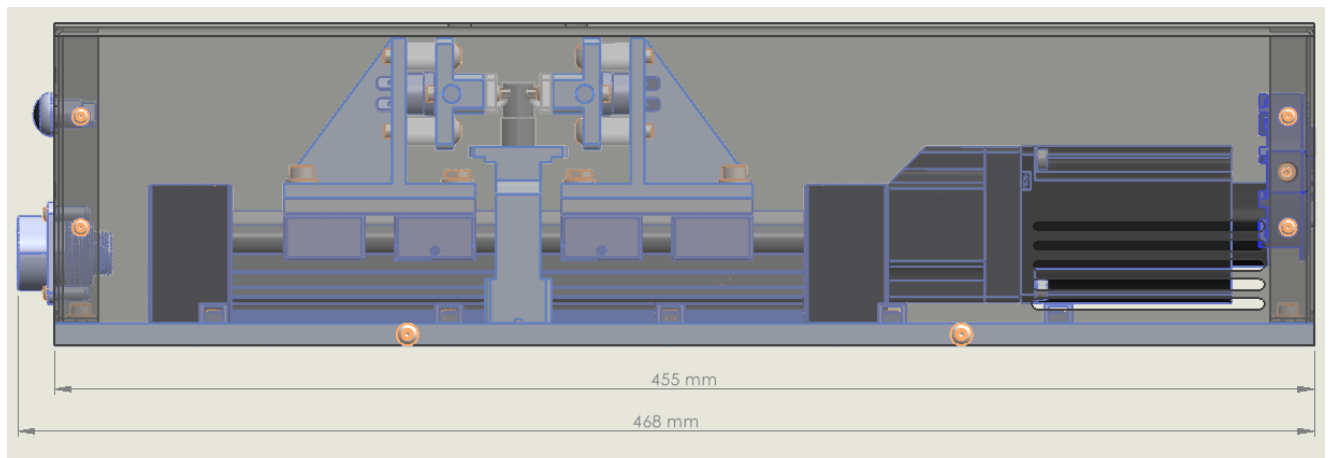
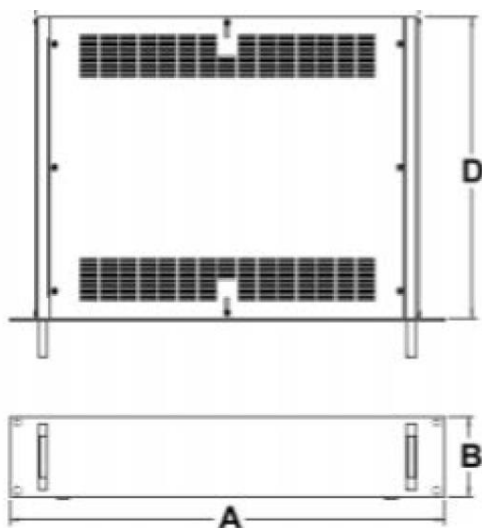


Figure 21: Side view, transparent, of sealing module



Width (A): 482.6 mm
 Depth (D): 425 mm
 Height (B): 177 mm

Figure 22: Control box dimensions

9.2 Module characteristics

	Sealing module	Control box
Dimensions W x D x H (in mm)	468 x 153 x 116	482.6 x 177 x 425
Mass (in kg)	5 kg	12 kg

- Capacity: 2 x CBS High Security tubes
- Dimensions of “sealing area” opening: 105 x 50 cm
- 4 x PT1000 temperature probes for regulation: 1000 Ohms
- 4 x cartridge heaters for sealing 4 x 70 W

9.3 Operating Conditions

- Service temperature: from +4 to +30 °C
- Operating humidity: < 90% RH (non-condensing)
- Air Noise Emitted (weighted sound pressure): < 70 dB (A)
- Connection to LAS: LAS manufacturer specific cable
- Connection to control box: Motor + Encoder + Sealer cables

9.4 Power Supply

- Supply voltage: 230 V ±10% single phase
- Supply frequency: 50 Hz
- Consumption: < 4 A
- Power: 920 W

9.5 Storage and transport conditions

- Use the packaging supplied by Cryo Bio System
- Temperature: from 0 to 40 °C
- Hygrometry: < 90% RH (non-condensing)

9.6 Handling of waste



Decree No. 2012-617 of 2 May 2012 on the management of waste batteries and accumulators and electrical and electronic equipment

9.7 Contact

Cryo Bio System

ZI n°1 Est 61300 Saint Ouen sur Iton - France
 Tel. +33 (0)233 346 464
 Fax +33 (0)233 341 198
 Customer service tel. +33 (0)233 346 444
 Fax. Customer service +33 (0)233 849 504
contact@cryobiosystem-imv.com

9.8 Declaration of Conformity



Déclaration UE de conformité - EC Declaration of Conformity

in accordance with of European parliament and council decision No 768/2008/EC Annex III



Identification produit / product identification:

Type de machine/ Type of machine :

ULISS

Code Article / Code

029530

N° de Série / S/N

Le Fabricant / Manufacturer :

CRYO BIO SYSTEM

Adresse / Address :

Zone Industrielle N°1 EST – BP 81 61300
Saint Ouen sur Iton- France

Déclare que la machine est conforme aux dispositions réglementaires qui lui sont applicables.

Declare under our sole responsibility that product in accordance with regulations in directives.

2006/42/CE, (Machine / Machinery)

2014/30/UE (CEM / EMC)

2014/35/UE (Basse tension / Voltage limits)

Basé sur les normes suivantes / Based on following standard :

- IEC 61010-1 :2010 , IEC 61010-1 :2010/AMD1 :2016

- EN IEC 61326-1 : 2021, EN 62311 : 2008

Le dossier technique est disponible chez le fabricant à l'adresse ci-dessus.

The technical file is available from the manufacturer at the address above.

Signature / Signed for and on behalf :

Cryo Bio System

Lieu de signature /Place of issue :

Saint Ouen sur Iton,

Date de signature / date of issue :

25/09/2023

Nom / Name :

Frederic Bernage

Position :

Directeur CBS