





EOVE-70

SECRETION MANAGEMENT DEVICE

TECHNICAL MANUAL

102-035 Rev DG _ 13/09/2022 _ Apply from API39 Version

Current version: API39

PAGES	CHANGES AND MODIFICATIONS
71 / 79	Update of preventive maintenance schedule – Pump must be replaced when the counter reaches 1000h
83-84	Preventive maintenance alarms

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INTRODUCTION

1 Warnings

1.1 Warnings and safety rules

This manual is specific to the EOVE-70 (ref EO70) Secretion Management Device (SMD). It provides information for maintenance technicians and operators.

Anyone who installs or conducts maintenance operations on the device must be qualified and trained and must have read and understood the entire manual before beginning any operations. Any temporary personnel or those in training must be supervised by a qualified technician.

For other warnings or safety rules, refer to the user manual.

1.2 Responsibilities

EOVE will not be responsible for damages or injuries caused by non-compliance with safety instructions and other instructions in this manual or by negligence during servicing, maintenance or repair of the ventilator.

1.3 Maintenance and guarantee

The guarantee of the appliance will only apply if maintenance is performed in strict compliance with the instructions in this manual. Maintenance of the appliance is compulsory.

Maintenance and replacement components are guaranteed and delivered by **EOVE**. In case of use of incorrect replacement components, **EOVE** cannot certify and ensure the proper functioning of the ventilator and the safety of the user and their entourage.

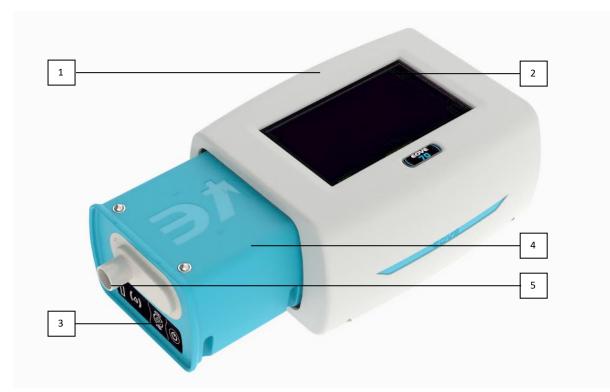
Replacement components are available from the **EOVE** catalogue and the **EOVE** Spare Parts List.

2 General information

The EOVE 70 (ref EO70) Secretion Management Device (SMD) provides treatment for patients not able to manage their secretions on their own. It provides Insufflation – Exsufflation mode for adults and pediatric patients as prescribed by an attending doctor.

2.1 Technical description

The EOVE-70 SDM consists of a ventilation module and a housing unit.



FRONT PANEL

EOVE-70 – Removable module

1. EO-Display housing unit	2. Display screen
3. Keyboard	4. SDM module
	5. Circuit port

REAR PANEL



1. Air inlet/outlet filters cover	2. SpO2 plug
3. DC Power plug	4. Remote control plug
5. Standby button	6. USB port 1
7. USB port 2	

REAR VIEW OF DEVICE WITHOUT DOCKING STATION

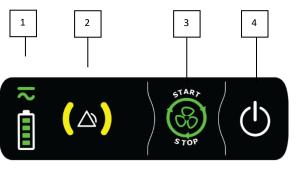


1. USB port	2. Electrical connection to housing unit
3. DC Car charger connection	



VIEW FROM BELOW OF EOVE-70 SMD MODULE

1.	Module label with serial number	2. Battery flap



5

KEYBOARD

- Power source indicator
 Alarm indicators
- 3. Treatment start / stop button
- 4. Power on/off button
- 5. Battery level indicator

EO-DISPLAY HOUSING UNIT

The EO-Display housing permits to control the EOVE-70 SMD module when it is inserted inside. The screen of the unit displays various information from the EOVE-70 SMD module and enables to set the different parameters.



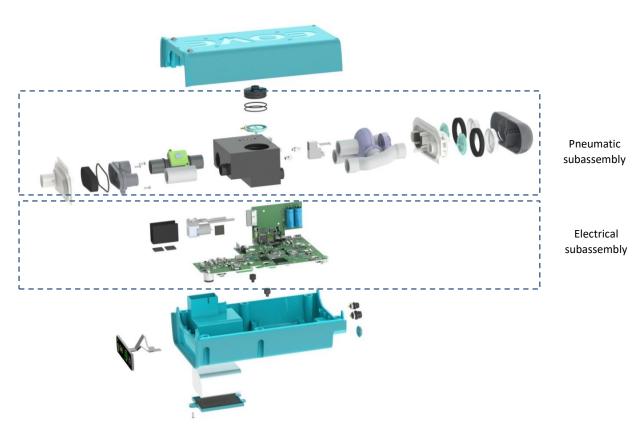
EO-Display housing unit – Inputs and outputs

1. DC Plug	4. USB connector
2. On/Off button	5. Display screen
3. Micro USB connector	

2.2 The Technical data

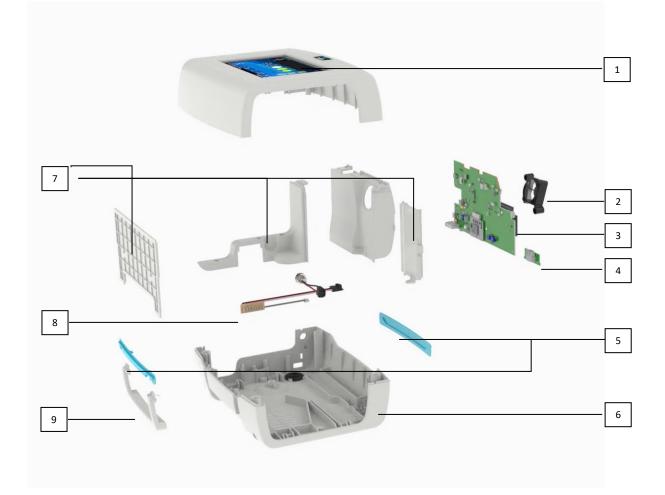
For technical data, refer to the **EOVE-70** user guide.

- 2.3 Structure and operation
- 2.3.1 EOVE-70 SMD module structure



EOVE-70 SMD module architecture

2.3.2 EO-Display housing unit structure



EO-Display Housing unit architecture

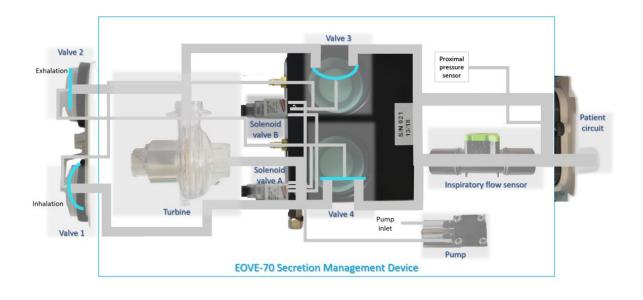
1. Upper shell & display screen	6. Lower shell
2. Cooling fan	7. Covers
3. EO-Display CPU board	8. Connection board & DC plug cable
4. USB board	9. Handle
5. Insert	

2.3.3 Operation of EOVE-70 SMD module

The operation of the EOVE-70 secretion management device is based on a closed control loop of the proximal pressure. There are two distribution mode, automatic and manual. In both modes, a pressure set point is send to the main actuator, the turbine. This pressure set point affects directly turbine speed which is proportional to pressure evolution. A high pressure set point will increase the turbine speed. This pressure is measured by the proximal pressure sensor. Thus, the determination of distribution parameters, especially the flow ramp rate affects the level of the turbine acceleration at the start of each phase of respiratory cycle.

At the same time, the two solenoid valves control the four valves to manage phases of respiratory cycles. A solenoid valve controls two valves during inhalation phase and the other one, the two others during exhalation phase.

The measurement of inspiratory flow completes the system to calculate the peak flow and the tidal volume on each respiratory cycle.

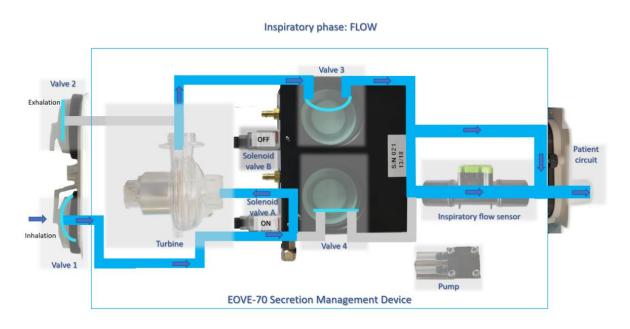


NOTE: When the EOVE-70 SMD is switched on but the ventilation is off, the turbine stills operate to remain cool. There are two speeds for cooling during standby. Below 45°C the turbine speed is low, and above the temperature threshold, the speed is higher. That is why there is always a low ambient noise when the device is on.

Operation of EOVE-70 SMD during inspiratory phase

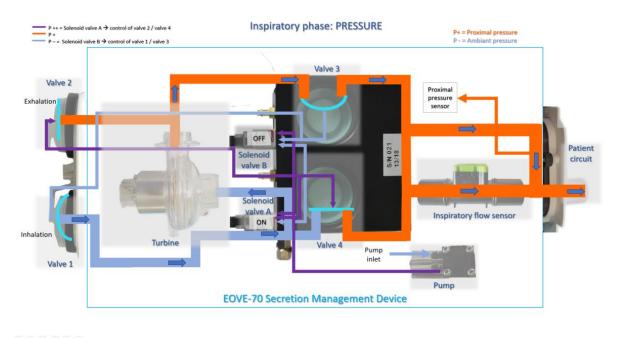
During inspiratory phase, the EOVE-70 secretion management device provides positive pressure to the patient. This pressure value depends on the set point configurated by the user and is proportional to the turbine speed.

The air is inhaled through valve 1, and flows toward the turbine, then the valve 3 and the inspiratory flow sensor.



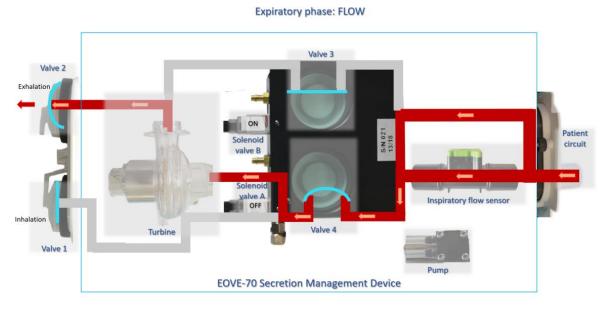
During inspiratory phase, the low pressure (blue circuit on the drawing below) is equal to the atmospheric pressure. The high pressure (orange circuit) provided by the turbine is equal to the proximal pressure received by the patient. The difference of pressure between the two circuits is positive.

Meanwhile, the pump enables to provide additional pressure to the two solenoid valves to control the four valves. The solenoid valve A switches on to close valve 2 and valve 4. The solenoid valve B is turned off, so the valves 1 and 3 are opened to permit the air to flow toward the patient.



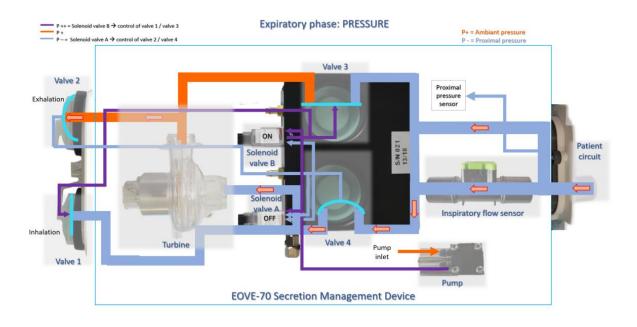
Operation of EOVE-70 SMD during expiratory phase

During the expiratory phase, the EOVE-70 secretion management device creates a suction to assist the patient when he coughs. The air flows through the inspiratory flow sensor, the valve 4, then the turbine and is exhaled by the valve 2.



During the expiratory phase, the low pressure is equal to the proximal pressure and the high pressure is equal to atmospheric pressure. The difference of pressure between the two circuits is negative.

The pump still provides additional pressure to the two solenoid valves to control the four valves. However, during the expiratory phase, the solenoid valve B turns on to close the valve 1 and the valve 3 and the solenoid valve A switches off to open the valve 4 and the valve 2 to permit the exhalation.



EOVE-70 MANAGEMENT

3 EOVE-70 Interface

3.1 Main menu

The home screen displays various information about current settings, pressure of treatment, power supply mode, etc... It is reachable from all other menus by pressing



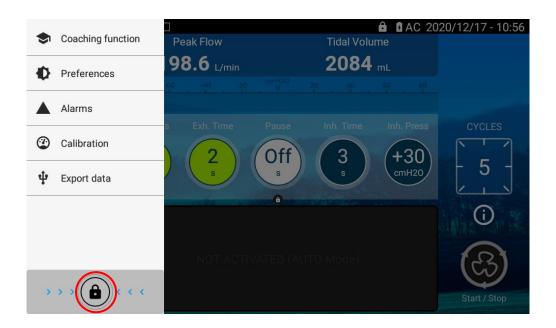
Home screen

1. Main menu access	2. Presets configurated
3. Power off button	4. Access to Help interface
5. Current treatment mode	6. Access to clinical settings
7. Treatment monitoring	8. Battery life indicator & current power source mode
9. Wi-Fi connected	10. Date
11. Time	12. Airway pressure indicator
13. Main settings bar	14. Start/Stop treatment button
15. Touch pad (manual treatment)	16. Cycles counter
17. Access to current settings information pop-up	18.

NOTE: Clinical settings and maintenance menu access are locked by default. To unlock both menus, reach the main menu and press on unlock button, then validate.

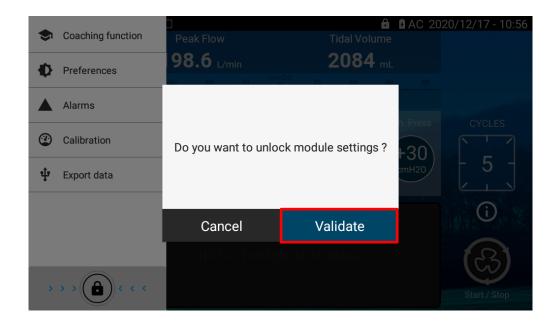
- To reach the main menu, click on from the home screen

- Hold unlock button until the validation popup appears



Main menu

- Validate



3.2 Preferences

Preferences menu enables to set up different parameters and to access to some information about the EOVE-70 SMD and its interface.

- From the main menu, click on Preferences

Mode: INEX (Auto)		AC 2020/05/05 - 10:46
← Preferences		
Options		
180° rotation		•
Settings as list		•
Brightness		• 80 %
Transitions beep		•
Date and time		
2020/05/05		¢
11:43		۵
	≡ 🧐 🔒	

From this menu, the user can adjust the following settings of the device.

Rotation of screen	Allows the screen to be rotated 180°. Press the small circle to rotate the screen.
Settings as list	Select the display mode of the settings menu. To display the settings as list, press the small circle. The circle and the bar will become blue.

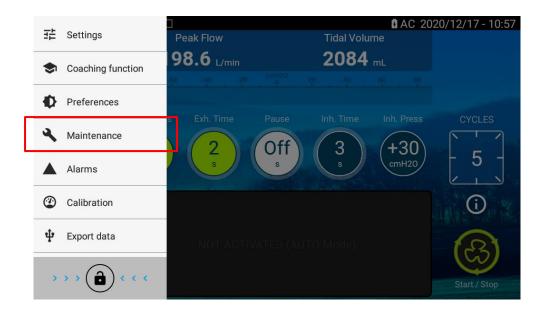
Current Date	Sets the current day, month and year. To set the date, click on the wheel and choose the date from the calendar. Press ok when completed.
Current Time	Sets the current time on 24h clock. To set the time, click on the wheel at the end of the line and choose the time from the dial. Press ok when completed.

Or display some information about tablet status or software versions.

Mode: INEX (Auto)	AC 2020/05/05 - 10:47
← Preferences	
2020/05/05	*
11:44	\$
Information	
Operating system version	eove-eodisplay-1.4.0
User interface version	2.0.0
Module serial number	EO0700718026
CPU version	C070000401
POWER version	P150000400
GAUGE version	5

3.3 Maintenance menu

3.3.1 Maintenance menu interface



To access to the maintenance menu, a pin code is required.

PIN CODE FOR ALL DEVICES: 6666

WARNING: DO NOT GIVE THE PIN CODE TO THE PATIENT.

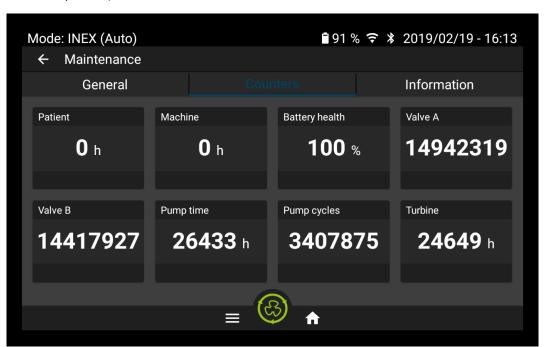
로 Settings				AC 2020/12/17 - 10:59
Coaching function	Enter your pin cod	Counters		Information
Preferences				
Aintenance				•
	1	2 авс	3 def	
	4 _{GHI}	5 JKL	6 мно	
	7 PORS	8 тич	9 _{wxyz}	
	×	0.		
	∇			

The Maintenance menu is split in three tabs:

- "General" tab:
 - Accessories control
 - Language selection
 - Connectivity
 - Interface app and Operating system versions management

Mode: INEX (Auto)		AC 2020/12/17 - 11:02
← Maintenance		
	Counters	Information
Interface		
Automatic Lock		•
Use SPO2 sensor		•
Inverted control pedal		•
Language		English 🌞
EOZ password		⊙ /
Help		••
Dationt		
	≡ 🧐 🔒	

- "Counters" tab: Display operation time of every component concerned by the preventive maintenance operations



- Display of various counters (battery ageing – turbine – solenoid valve – machine – patient)

- "Information" tab:
 - Display of serial number
 - Display of the current software versions
 - Display of the operating system information

Mode: INEX (Auto)	A	C ᅙ 🗚 2018/07/25-11:53
← Maintenance		
General	Counters	
Serials		
Module		EO0700718026
Blower board		0000FB025214
Blower		000018022036
Valve A		0000000017X
Valve B		0000000017X
Pneumatic block	<u>a</u>	000021-13/18

3.4 EOVE-70 interface servicing

3.4.1 Interface software update

WARNING : THE FOLLOWING PROCEDURE ONLY CONCERN THE INSTALLATION OF THE CLINICAL APP ON THE EO-DISPLAY HOUSING UNIT.

NOTE: Interface update of the EO-Display must not be done while ventilation module is operating.

Copy the interface software version required on a USB Drive and plug it to the USB port 1 of the EO-Display housing unit.

Warning: Only one interface software version must be copied on the USB stick

Note: Use a USB Drive formatted FAT32 / 32Go max / Class 10 / 1 partition



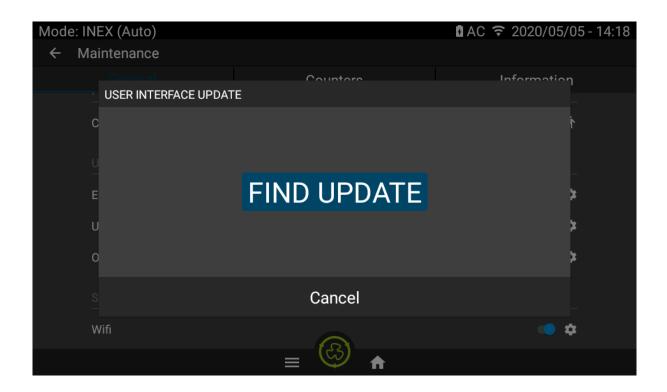
- Click on EO70 user interface

Mode: INEX (Auto)		🖪 AC 훅 2020/05/05 - 14:11
← Maintenance		
General	Counters	Information
Clear patient data		Clear 🛉
Update		
EO70 user interface		•
User manual		\$
Operating system		\$
System		
Wifi		• ¢
	≡ 🧐 🔒	

- Check module autonomy and plug the AC if necessary
- Click on Continue

Mode: INEX (Auto)		🛿 AC 🗢 2020/05/05 - 14:17
← Maintenance		
	Countors	Information
UPDATE INFORMATION		
c U		ŕ
	erface update can take several n	
	-display to AC or check that your igher than 1h before to start upd	
U	5	×
o		2
s Cance	el Co	ontinue
Wifi		• ‡

- Click on *Find Update*



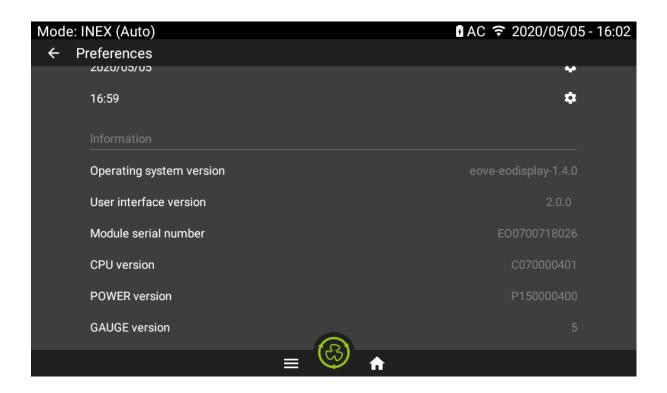
- Verify the version available matches with the one required and click on Install

Mode: PRM		■ +AC 2010/05/05 - 14:47
\leftarrow Maintenance		
General	Countara	Information
USER INTERFACE UPDAT	TE	
с		ŕ
<u>u</u>		
E	eo70app-2.0.0-d2891fc.apk	*
U		*
O		*
s Cance	11 le	ISTALL
Wifi		• ‡

- Wait for the installation until tablet reboot is complete

Mode: PRM		∎+AC 2010/05/05 - 14:48
← Maintenance		
General	Countara	Information
USER INTERFACE UPDA	ТЕ	
C U	nstalling (Application will restart)	4
F		
	\bigcirc	ſ
U	Ŭ	*
o		*
S —		
Wifi		• *

- Check in PREFERENCES menu that the interface version installed is the one required

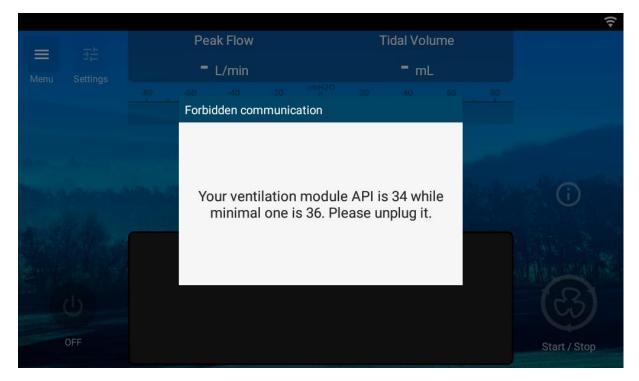


3.4.2 API version change

The device can operate only if the CPU software and the interface are in same API version. In case of API version change, update all the software in the following order:

- Upgrade of the CPU software,
- Upgrade of the interface software.

To keep communication between ventilation module and EO-Display, their software must be in same API version. Otherwise the following popup appears.



3.4.3 Android system update

- Copy the OS version on a USB flash driver with same specifications as those required for the interface update

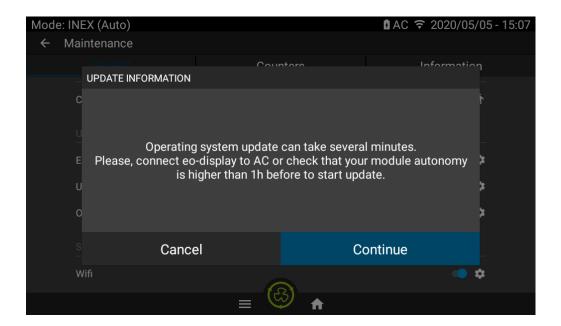
Name	Date modified	Туре	Size
LOST.DIR	5/5/2020 2:28 PM	File folder	
eodisplay-1.4.0-user-devkeys-eo70app-2.0.0-update.zip	5/5/2020 3:37 PM	Archive WinRAR ZIP	308,559 KB
eodisplay-manifest.xml	5/5/2020 3:31 PM	XML Document	1 KB

WARNING: Keep OS version and its manifest together and copy them on the USB Drive. Do not modify the manifest which is dedicated to one single version of the OS.

- Plug the USB stick to the EO-Diplay housing unit
- Go to the Maintenance menu and select Operating System

Mode: INEX (Auto)		AC 秺 2020/05/05 - 15:06
← Maintenance		
General	Counters	Information
Clear patient data		Clear 🛉
Update		
EO70 user interface		\$
User manual		\$
Operating system		\$
System		
Wifi		• •
	≡ 🧐 🔒	

- Follow update recommendations and press Continue



- Click on Find Update

EoveUpdater	
	FIND UPDATE
eove-eodisplay-1.4.1	Will wipe userdata and cache
\triangleleft	

- Check that the version displayed is the one required and click on it to launch the update

EoveUpdater		
	FIND UPDATE	
eove-eodisplay-1.4.1		Will wipe userdata and cache
\bigtriangledown		

- Wait until the installation is complete and the display screen reboots
- Verify in PREFERENCES menu the Operating System version

Mode: INEX (Auto)	🛚 AC 훅 2020/05/05 - 14:49
← Preferences	
2020/05/05	· · · · · · · · · · · · · · · · · · ·
15:47	*
Information	
Operating system version	eove-eodisplay-1.4.1
User interface version	2.0.0
Module serial number	E00700718026
CPU version	C070000401
POWER version	P150000400
GAUGE version	5

3.4.4 Help interface and user manual update

NOTE: The user manual must be updated in the language selected in the interface

- Download the user manual version in the language required
- Copy it onto a USB stick

Name	Date modified	Туре	Size
🚖 manual_eove_70_en_US RevDA.pdf	05/05/2020 15:22	Adobe Acrobat Docu	1 644 Ko
🗟 manual_eove_70_fr_FR RevDA.pdf	05/05/2020 15:22	Adobe Acrobat Docu	1 702 Ko

- Go to the maintenance menu and launch the update of the user manual

Mode: INEX (Auto)		AC 穼 2020/05/05 - 16:12
← Maintenance		
General	Counters	Information
Clear patient data		Clear 🛉
Update		
EO70 user interface		\$
User manual		•
Operating system		\$
System		
Wifi		• •
	≡ 🧐 🔒	

- Click on "Find Update"

Mode: INEX (Auto)		🛿 AC 훅 2020/05/05 - 16:14
← Maintenance		
	Countara	Information
USER MANUALS UPDATI	E	
с		ŕ
E	FIND UPDATE	×
U		×
o		*
	Cancel	
Wifi		• •

- Select the file required and click on "Update"

Mode: PRM			■ +AC 2010/05,	/05 - 14:52
← Maintenance				
	Co	atoro	Informatio	า
USER MANUALS	UPDATE			
с	manual_eove_70_ manual_eove_70_			ŕ
E				*
U				×
O				*
	Cancel	U	PDATE	
Wifi	E.	2	•	\$
	$\mathcal{P} \equiv \mathcal{Q}$	ジ 🔒		

- Wait until the end of the update

Mode: PRM		∎+AC 2010/05/05 - 14:52
← Maintenance		
General	Countare	Information
USER MANUALS UPDATE	1	
С		ŕ
U -		
E	Update succeeded.	*
U		*
0		*
s	Close	
	Close	
Wifi		• ¢
	≡ 😳 🔒	

- Activate the Help interface

	mation
Module	
E00700718026	\$
Interface	
Automatic Lock	•
Use SPO2 sensor	•
Locale Engli	sh 🌣
Help	

- Mode: INEX (Auto) AC 2020/12/17 - 10:55 Tidal Volume Peak Flow 퍎 \equiv 198.6 L/min 2084 mL CYCLES 3 +30 -30 Off 2 5 cmH20 9 cmH20 S Preset 2 (\mathbf{i}) (l)?) OFF Start / Stop
- Check that the Help shortcut is displayed and click on it

-

- Look for the information required



3.4.5 Language selection

Mode	e: INEX (Auto)		AC 🗢 2020/05/05 - 15:50	
÷	Maintenance			
		Counters	Information	
	Interface			
	Automatic Lock		•	
	Use SPO2 sensor		•	
	Inverted control pedal		Current language	;
	Language		English 😧 — Language settings	;
	Help		••	
	Patient			
	Clear patient data		Clear 🛧	

- Add a language then slide it up to the top

Language preferences	:
1 English (United States)	•
2 Italiano (Italia)	
+ Add a language	
\triangleleft	

- Click on return button, the application will restart automatically.
- NOTE: The default language is English.

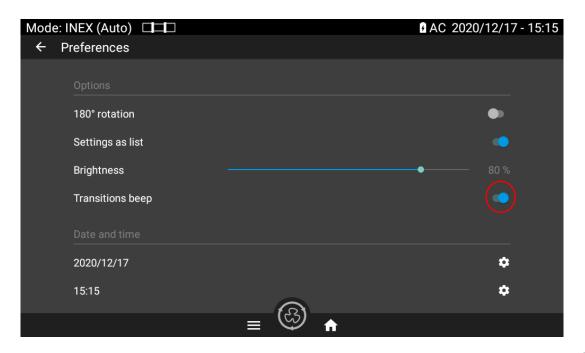
3.4.6 Brightness of the screen

- Go to Preferences menu
- Slide the cursor to adapt the brightness

Mode:	INEX (Auto)		AC 2020/12/17 - 15:15
← F	Preferences		
	Options		
	180° rotation		•
	Settings as list		•
	Brightness		● ────────────────────────────────────
	Transitions beep		•
	Date and time		
	2020/12/17		\$
	15:15		\$
		≡ 🖾 🛧	

3.4.7 Transition Beep

- Go to Preferences menu
- Enable *transitions beep* to allow module to always trigger a beep when a transition between inspiration and expiration occurs.



3.5 Clear patient data

To reset patient data, click on Clear, then Validate

Mode: INEX (Auto)		🛿 AC 훅 2020/05/05 - 15:56
← Maintenance		
General	Counters	Information
Patient		
Clear patient data		Clear
Update		
EO70 user interface		\$
User manual		\$
Operating system		٠
System		
	≡ 🙆 🔒	<u> </u>

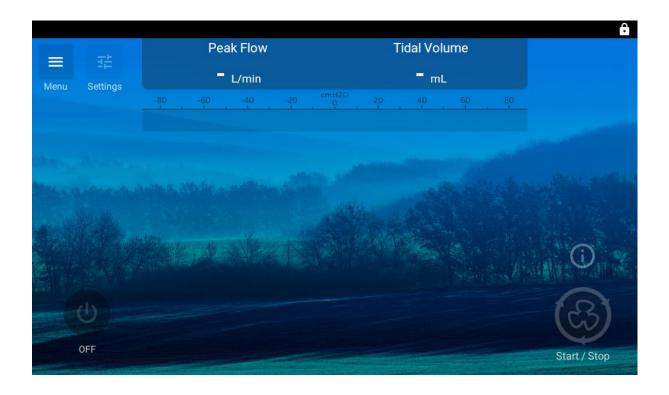
Mode: INEX (Auto)			A	C 훅 2020/05/05 - 15:5	7
\leftarrow Maintenance					
General	Cou	nters		Information	
Patient					
Clear patient data				Clear 🕇	
Update	Do you really want t	o clear patient da	ata?		
EO70 user interface				\$	
User manual				\$	
Operating system	Cancel	Validate		\$	
System					
1100		3)		<u> </u>	

WARNING: A CLEAR PATIENT DATA RESETS PATIENT COUNTER AND ERASES ALL THE EVENTS FROM THE SMD MODULE MEMORY. IT RETURNS THE DEVICE TO FACTORY CONFIGURATION.

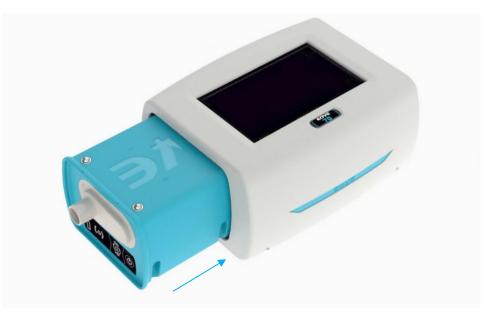
4 SMD management

4.1 Communication

Physical connection between EO-70 SMD module and its EO-Display housing unit is carried out by the connection board, so, while the module is inserted into the housing unit.



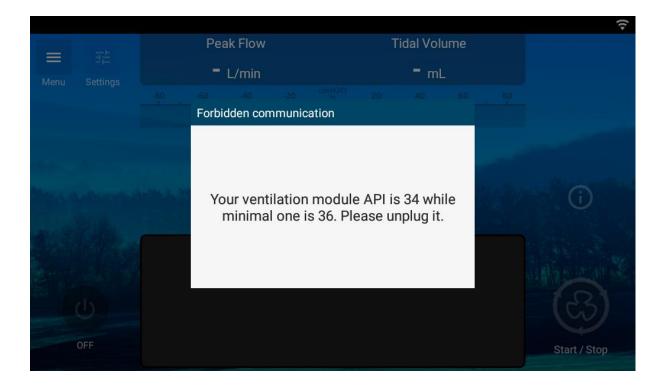
- To connect the display screen to the EOVE-70 SMD module, insert the module into the EO-Display housing unit and switch it on.



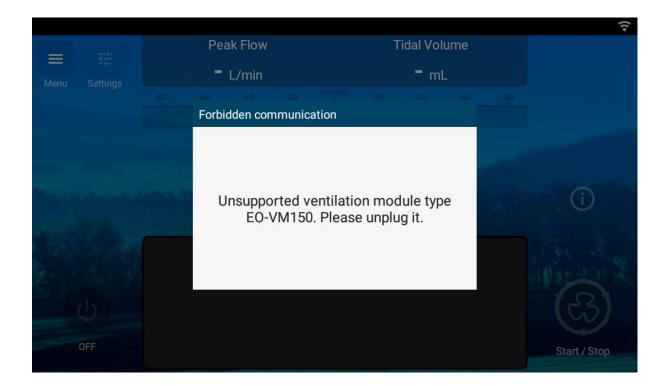


- Check that the module is connected, and information are displayed on the screen

NOTE: API version must match between interface software version and the CPU software version of the ventilation module. Otherwise, a popup appears, and communication fails.



WARNING: EO-Display housing unit dedicated to EO-70 SMD use is not compatible with another ventilation module type such as EO-150 ventilator.

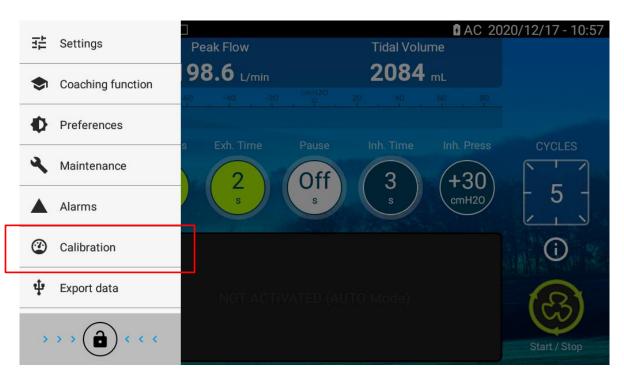


5 Calibration

The patient circuit must be calibrated to provide performances in accordance with EOVE70 SMD specifications.

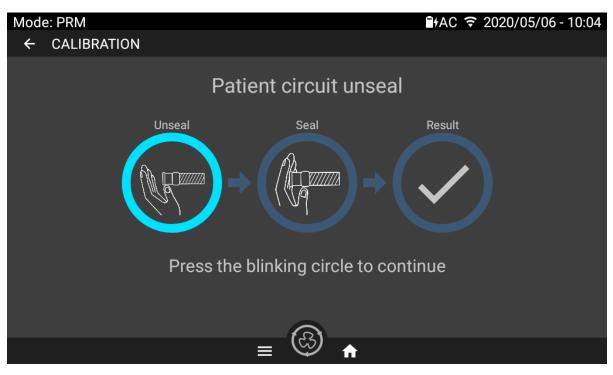
The process detailed below includes two steps which corresponds to the IPPB mode. If the INEX mode is selected, only the first step will be performed.

- Select the mode required and connect the proper circuit and accessories (without patient interface)



- Go to the calibration menu

- Launch calibration by pressing "Start"



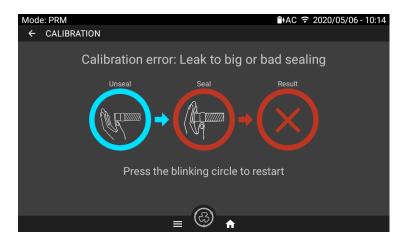
- Unseal the patient circuit extremity and click on the blinking circle
- Wait until the circle is complete
- Seal the patient circuit extremity and click on the blinking circle
- Wait until the circle is complete
- Reset the calibration menu by pressing on "Validate"



Calibration can be aborted at any moment if necessary (by pressing on "abort", starting the treatment, or selecting another menu) and data collected during the calibration in progress won't be saved.



In case of error during the seal or unseal phases, an error informing about the error will be displayed (image below shows an example during Seal step):



Then click on "abort" to restart the calibration process

6 EOVE-70 SMD Servicing

6.1 EO-Toolkit presentation & settings

EO-Toolkit is a servicing software which enables to:

- Download the event logs
- Update module software versions
- Manage the counters and serial numbers

Configuration of EO-TOOLKIT

EO-VM70 31.00	MAIN WAVEFORMS TR	ACES STREAMINGS	Ventilation mode	e			<					٠	
atabase B_MEASUREMENTS	MEAS_BAT_TEMPERATURE_s	≡+		Se	earch a d	iatabase i	item		E00700 E0-VM70				
EAS_BAT_TEMPERATURE_s	24 °C	240	~	c +	+ -			·y0	Туре	EO-VM70			
AD_DAT_TEMPERATURE_S	24 0	240		6 4	+ -	•		30	Serial	E00700718026			
									CPU	00:04:3e:9b:bf:d5			
									API	C070000103 (7224 31.00	660)		
									POWER	P150000300			
									GAUGE	5			
									Clock	2018-07-31T09:11:	01.000Z		
									COU	NTERS	SERIALS		
									Battery	0			
									Battery Ageing	100			
									Machine	0.20 hours (12 min	utes)		
									Patient	0.23 hours (14 mini	utes)		
									Pump Cycle	27			
									Pump Time	0.20 hours (12 min	utes)		
									Turbine	0.17 hours (10 mini	utes)		
									Valve A	102			
									Valve B	98			

Configuration of EO-Toolkit

- Launch EO-Toolkit
- Click on Settings

📵 eo-toolkit - main	– a ×
File	
	CONNECT 4
	Entrop .

- Choose two consecutive usb ports lower than 10

- Select the API file required. It must be accordance with software version which might be updated

Main USB port (CPU) Secondary USB por COM6 - COM5	t (Power) Auto Detect USB Ports	1	
Auto Select API File D:\eo70\eo70-api31-00.jso	n	7	
API descriptor file			
Streamings displayed duration (s)	C:\Users\Lucas.delplan		
Streamings displayed duration (s)	C:\Users\Lucas.delplan Streamings directory		
		Samples/seconds: 100.00 Sample delay: 10 ms	
12 Streamings sample delay (ms)	Streamings directory Streamings filter ratio	Samples/seconds: 100.00	
12 Streamings sample delay (ms) 10	Streamings directory Streamings filter ratio	Samples/seconds: 100.00	

6.2 Events Log menu / Data retrieval

6.2.1 Events log

The EO-Toolkit log permits to retrieve EOVE-70 SMD technical data until 10 000 events. Thanks to the Auto refresh feature, it is also possible to display the events in live.

- First connect the device to the computer and launch EO-Toolkit
- Go in settings and select the file path required to save the events logs

ED-VM70	93.99	PRINCIPAL COURS	ES TRACES STREAMINGS LOG	INEX 👻 🥠 🌲		
3	8 ×	Auto refresh January 3	23rd 09:43 pm January 24th 04:30 am Log r	name Category Q		Permittee
DATETIME	INDEX	NAME	CATEGORY	DETAILS	2019-01-2410.055.02.0002 LOG_START_VENTIL	
2019:01:24 4:30:16.000	139	LOG_SERIES	Paramètres		Under 126) "details": (
2019:01:24 4:30:16.000	138	LOG_STOP_VENTIL	Port US8 principal (CPU) Port US8 se	condeire (Alim.)	<pre>"additionalLogElements"; "enumEntriesRames"; []; "modifectings"; {} }; "snapshot"; {</pre>	-07
2019:01:24 4:30:15.000	137	LOG_SETTINGS_INFO	/dev/tty.usbserial-145301 👻 /dev/tty.		<pre>"magenot" { { *divider": 1, *enumValue*: *SET_INEX* *div * * ****</pre>	
2019:01:24 4:30:15.000	136	LOG_START_VENTIL	Sélection Auto. du fichier API		"isInTntegrityCHC"; tro "name"; "SIT Mode", "rawWike"; 0 "value": 0	n,
2019:01:24 4:27:45.000	135	LOG_DEVICE_CONNECTED	/Users/nicolasm/Work/Eove/eo70-c; Fichier descripteur de IXPI	pu-software/Sc), { "dividec": 10,	
2019:01:24 4:27:32.000	134	LOG_DEVICE_DISCONNECTED		/Users/nicolasm	"Nor" 1/9"1", "NarregitzgORC": fai "narre": "NOR BATE_ut, "rasValue": 32787, "unit": "UNIT & PER_MIS "value": nall	еа, ЮТЕЧ,
2019:01:24 1:55:35.000	133	LOG_SERIES		noles Streamings de fittage des Streamings Echantillons/seconde: 25.00). ["divider": 100, "(d": "10.7".	
2019:01:24 1:55:35.000	132	LOG_STOP_VENTIL	40 1	Délai d'échantillonnage: 40 ms	"isinintegrityCSVC"; fol "name"; "XXXV I; TIME_U", "raxValue"; 29, "unit"; "NNT_SIC", "value"; 0.29	90,
2019:01:24 1:55:07.000	131	LOG_SETTINGS_INFO), *divider*: 180,	
2019:01:24 1:55:07.000	130	LOG_START_VENTIL	Users/nicolasm/Documents		"id": "19-4", "isInIntegrizyCRC": fol "name": "MORE_TIME_u", "umivElue": 32767, "umivElue": TVNIE_BACC,	se,
2019:01:24 1:55:04.000	129	LOG_SERIES			"value": null); (*divider": 180,	
2019:01:24 1:55:04.000	128	LOG_STOP_VENTIL	LOG_CAT_SYSTEM		"10": "19-2", "11ThTneprisyCPC": fal "namo": "9000 P.TTNE_u", "nawValue": 6,	,
2019:01:24 1:55:02.000	127	LOG_SETTINGS_INFO	LOG_CAT_HIDDEN		"usio": "Usir_SIC", "value": 0); {	
					Erve Too	blið v1.0.31 - dévelaggá avas 4 gar l'ágaiga Eove

- Click on LOG to display the events

1 2	3 4	5 6					
eo-toolkit - log						-	٥
Eore Toolhit		HOME				DISCONNECT 4	ŝ
to x	Auto update						
	Auto upuste						-
01/01/1970 12:00 AM	01/01/2099 12:00 AM Name	Category Q	5				
DATETIME	NAME	CATEGORY	DETAILS	SUPPLY	VENT.		
2019/02/19 - 16:59:05	Stop ventilation	System event		0	* =		
019/02/19 - 16:58:57	Start ventilation	System event		0	5		
019/02/19 - 16:12:52	Stop ventilation	System event		0	5		
019/02/19 - 16:12:24	Start ventilation	System event		0	*		
2019/02/19 - 15:53:15	Stop ventilation	System event		۵	*		
019/02/19 - 15:53:08	Start ventilation	System event		0	*		
019/02/19 - 15:46:36	Modification setting	Setting event	Mode changed from 1 to 0	0	*		
019/02/19 - 15:40:58	Event station detection	System event	Module removed from the station	۵	4		
019/02/19 - 15:40:24	Stop ventilation	System event		0	4		
2019/02/19 - 15:40:14	Start ventilation	System event		٥	5		
019/02/19 - 15:39:03	Event station detection	System event	Module inserted in the station	*	5		
019/02/19 - 15:39:00	Device started	System event			5		
019/02/07 - 11:26:13	Device stopped	System event			5		
019/02/07 - 10:34:29	AC back	System event			5		
019/02/07 - 10:32:30	Modification setting	Setting event	Mode changed from 0 to 1	0	5		
019/02/07 - 10:11:31	AC back	System event			5		
2019/02/07 - 10:11:26	Event station detection	System event	Module inserted in the station	8	30 -		

Eove Toolkil v1.3.1 - developed with * by the Eove leam

1. Refresh

2. Clean the current log

4. Auto refresh

- 3. Export the current log in an Excel file
- 5. Generate the event log

6. Filters

6.2.2 Export Clinical data from EO-Display

Observance until one year of use can be downloaded and displayed in Clinical Software

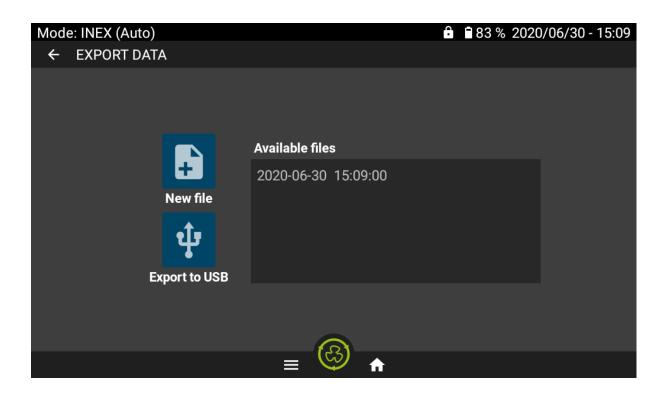
• Connect an USB key to the EO-Display

Note: Use a USB Drive formatted FAT32 / 32Go max / Class 10 / 1 partition

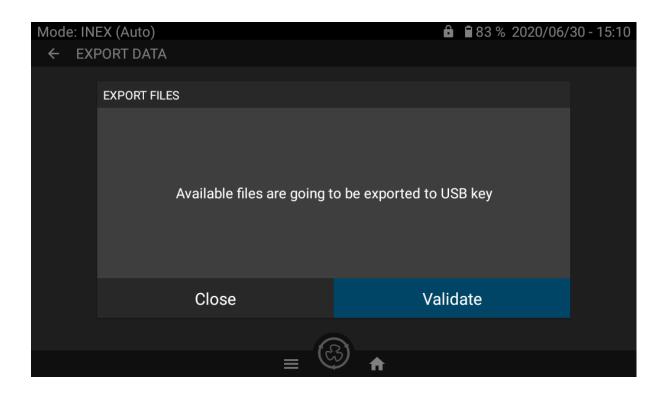
• Go to "Export Data" menu

Coaching function	D Peak Flow	Tidal Volu		20/12/17 - 10:56
Preferences	98.6 L/min	2084		
Alarms				
Calibration	s Exh. Time	Pause Inh. Time	Inh. Press	CYCLES
🜵 Export data	s	S S	cmH20	
		8		()
	ΝΟΤ ΑΟΤΙVΑ			B
> > > (a) < < <				Start / Stop

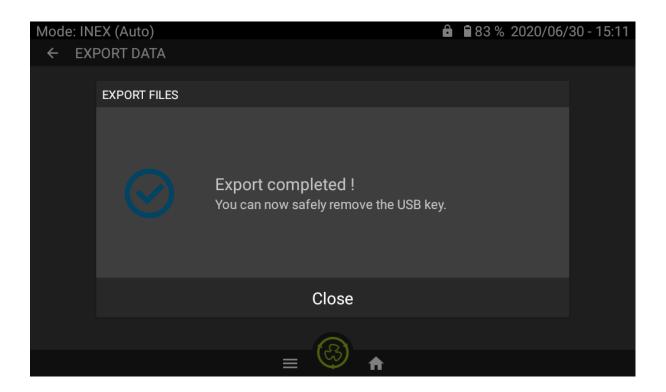
• Generate a new file if necessary, then click on Export to USB



• Click on Validate



• Wait until the export is complete



6.2.3 Download Clinical data from EO-Toolkit

- Launch EO-Toolkit and connect the EO-70 SMD module to the computer by USB
- Click on settings



- Select the folder where you want to save data then click on OK

ia eo-toolkit - home File							- 1	×
: Evre Toolkit						CONNECT 4	\$	
	Settings							
	CONNECTION	CHECK MODULE	FIRMWARE	DATA	LOG			
	Data export directory C:\Users\Lucas.delpla	n\Desktop\LOGS E070						
					OK EXPORT IMPORT			

- Click on Connect

🞾 eo-toolkit - home	_		×
File			
Eove Toolkit	Ŕ	3	

- Click on the dropdown menu

🞾 eo-toolkit - home File		- 🗆 X
: Eove Toolkit	HOME	DISCONNECT 🌵 🐯 📑
DIAGNOSIS	MEASUREMENTS	E00700718026
Start a di	agnosis. 💽 START	EO-VM70

- Click on create EOZ.

E00700718026	
00:04:3e:9b:bf:d5	
C070000401 (f3fb3c5)	
36.00	
P150000400	
5	
2020-05-06 10:12:46	/
6666	
SERIALS	3
100	i /
1.24 h (an hour)	
1.27 h (an hour)	1 Z
3408007	1 Z
26433.85 h (3 years)	i /
24649.66 h (3 years)	i /
14942824	î /
14418354	i /
	00:04:3e:9b:bf:d5 C070000401 (f3fb3c5) 36.00 P150000400 5 2020-05-06 10:12:46 6666 SERIALS 100 1.24 h (an hour) 1.27 h (an hour) 3408007 24649.66 h (3 years) 14942824

6.3 Display the observance

- Launch Clinical Software (from v1.5.0)



- Import a file and select the appropriate patient. Possibility to add a new patient if necessary (refer to user manual)

Import file New patient Organisation Patient search	New patient Organisation	Ø	•	
Organisation	Organisation			
Patient search	Patient search			

- Display the observance

≡	Ø 🗑	\$ - (Event Month 👻				X
Import file	First name EOVE	6/2/20	21 💌	June 2021	6/2/2021 - >	Statistics comments			
+ New patient	Last name PATIENT Organisation All organisations			Observance		Observance:	2/6/21	>	2/6/21
Organisation		12					Total	IPPB	INEX
Patient search	Address Area code City	10				Duration (Total)	2 min	0 s	2 min
EOVE PATIENT 2000-01-01	Country France Cell phone Home	8		Date: 2/6/2021 Duration (Total): 2 min		Duration (day)	2 min	0 s	2 min
	Birth day 2000-01-01 Sex Male	- 6		Treat. (Total): 10 Duration (INEX): 2 min Treat. (INEX): 19		Treatments	19	0	19
	Weight Height	4				Average time	6 s	0 s	6 s
	Administrative	2							
	Hospital Diagnostic code	o		2		∯ Observance - Use			
	Insurance Insurance code			Use by day		# of days of use	1	0	1
	Devices	5				# of days of use > 5 min	o	0	0
	 E00700718027 E0070 	4	Total			% of use > 5 min	0	0	0
	VentilData-E00700718027_2021-0	(intes)							
		tion (m				₿ Observance - Treatments			
		2 -				# of days > 5 treatments	1	0	1
		1				% of use > 5 treatments	100.0	0	100.0
		0		2					

- Display the events

=		/ 🗑	🌣 - 🖨			E fount	h -		×
Import file	First name	EOVE	Date 🔻	Category	Туре	Description	-	Monitoring Seriel Numbers comments	
New patient	Last name Organisation	PRTIENT All organisations	03/06/2021 12:44:35	System event	AC back			Dote	02/06/2021 11:02:02
Organisation			03/06/2021 12:44:33	Alarm event	Alarm deactivated	BATTERY < 20% (Supply)	Ц	Mode	INEX
Patient search	Address Area code City		03/06/2021 12:44:01	Alarm event	Alarm activated	BATTERY < 20% (Supply)		Res. Rate	10 c/min
EDVE PATIENT 2000-01-01	Country Cell phone Home	France	03/06/2021 12:43:49	System event	Device started			Insp. Time	3 1
	Birth day Sex	2000-01-01 Male	02/06/2021 11:02:57	System event	Device stopped			Exp. Time	2.6
	Weight Height		02/06/2021 11:02:52	System event	Stop ventilation			MON_P_TIME_U	0.42 s
	Physician		02/06/2021 11:02:28	System event	Start ventilation			VTI	813 mL
	Hospital Diagnostic code Insurance		02/06/2021 11:02:28	Setting event	Modification setting	Exhal. Pressure -60cmH20 ->-30cmH20		MON_FLOW_MIN_S	-137.3 L/min
	Insurance code		02/06/2021 11:02:28	Setting event	Modification setting	Insp. Pressure +60cmH20> +30cmH20		\$P02	- %
	E007007	718027	02/06/2021 11:02:28	Setting event	Modification setting	Operating Mode Auto -> Manual		Pulse Rate	- c/min
	E0070		02/06/2021 11:02:26	System event	Stop ventilation			Supply	AC
			02/06/2021 11:02:02	System event	Start ventilation				
			02/06/2021 11:02:02	Setting event	Modification setting	Exhal, Pressure -40cmH20 -> -60cmH20			
			02/06/2021 11:02:02	Setting event	Modification setting	Insp. Pressure +40cmH20> +60cmH20			
			02/06/2021 11:01:59	System event	Stop ventilation				
			02/06/2021 11:01:35	System event	Start ventilation				
			02/06/2021 11:01:29	System event	Calibration successed				
			02/06/2021 11:01:17	System event	AC back				
			02/06/2021 11:01:15	Alarm event	Alarm deactivated	BATTERY < 20% (Supply)			
			02/06/2021 11:01:02	System event	Calibration requested				
			02/06/2021 11:01:01	System event	Exit maintenance mode				
			02/06/2021 11:01:00	Settingevent	Modification setting	Exhal. Pressure -30cmH20 -> -40cmH20			
			02/06/2021 11:01:00	Setting event	Modification setting	Preset Applied Preset 1→No preset			
			02/06/2021 11:01:00	Setting event	Modification setting	Insp. Pressure +30cmH20 -> +40cmH20			
EOVE	Note :		02/06/2021 11:00:48	Alarm event	Alarm activated	BATTERY < 20% (Supply)			
COVE			0100/0011100/10	Series and	Entor moletonomo mode		*		

6.4 Software update

WARNING: After an API change, the clinical settings might be lost. We recommend saving settings and trends before performing an update which require an API change.

WARNING: The device can only operate if the CPU software and the interface have the same API version.

- Upgrade of the CPU software,
- Upgrade of the interface software.

Procedure from TOOLKIT

WARNING: WINDOWS 10 IS RECOMMENDED.

WARNING : MAKE SURE TO CONNECT THE VENTILATOR TO A PORT WHOSE NUMBER IS LESS THAN 10

- Launch EO-Toolkit software
- Connect the EOVE-70 module to AC power
- Connect the EOVE-70 module to the computer by usb

- Click on Settings

-

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ree Eave Toolhit	сомиест 🜵 🍘 🗷
	Service .

- Go to "Firmwares" tab

Go to Think					- 0 ×
Fichier					CONNEXION 🌵 🍪 🎫
Descentres					_
Paramètres					
CONNEXION	CONTRÔLE MODULE	FIRMWARE	DONNÉES	INTERFACE	JOURNAL
Paquet pour EO-VM70 Z:\preproduction_binaries\re	eleases\eo70\default\eo-pkg\eo70-d	lefault.eopkg	■		
Paquet pour EO-VM150 Z:\production_binaries\relea	ases\eo150\default\eo-pkg\eo150-d	efault.eopkg			
					OK EXPORTER IMPORTER
				EOVE co-toolhit v2	

Select the software package required for the update.

CONNECTION CHECK MODULE FIRMWARE	DATA	INTERFACE	LOG	STREAMINGS
Package file for E0-VM70 C:\Users\E0VE\Documents\Software E070\e070-app-v2.0.0-C070000401-P150000400-5.eopkg				
Package file for EO-VM150				

NOTE: The package files include the ventilator software (CPU) and power software (PIC)

The CPU software file is always named C07	7000XXX_apiXX.H86
	File extension
CPU '	
Ver	ntilator
n	name API version
	Version
The PIC software file is always named P150	0000 <u>XXX.hex</u>
	File extension
PIC	
Vent	tilator Version
2	ame
lia	

- To update CPU and PIC, click on "Update firmwares"

i es-boollat	CONNECT	ψ	\$)
			 	- 1

- Connect the module to the computer by usb
- Connect the AC power to the ventilation module

i w-bookit	CONNECT	Ψ	鐐	E C
C Updating firmwares				
Firmware update 1. Connect an USB cable from the computer to the module 2. Connect AC external power supply to the module 0. CANCEL				
EOVE of the state	0	developed	with v by t	the Eore team

- Switch off the device then click on OK

i co-loolhil			I	CONNECT	ψ 🕸	
	Updating firmwares					
	Firmware update CPU will be flashed with version: C070000401					
	1. Switch off the module	OK CANCEL				
			COVC			
			EOVE co-foolkit v2.8.1	0de	reloped with 🔻	by the Eove team

Checking

Once the update performed:

- Pair the EOVE-70 module to the docking station
- Go to Information tab of Maintenance menu or go to Preferences menu to check that the software versions are updated and displayed properly.

Mode: IPPE			Ĥ	AC 2020/12/17	- 15:56
← Prefe	erences				
202	20/12/17			*	
15:	56			\$	
Info	prmation				
Ope	erating system version			eove-eodisplay-1.5.0	
Use	er interface version			2.3.0 (eodisplay)	
Мо	dule serial number			E00700000DFV	
CPU	U version			C070000604	
PO	WER version			P150000400	
GA	UGE version				
		<u></u>			
		≡ 🧐 🔒			

6.5 Serial numbers management

All critical components are tracked by serial number since manufacturing. The serial number must be updated in device memory if the component is replaced during maintenance operation.

NOTE: If the motherboard is changed, it's necessary to read all the serial numbers and update them in the new board.

	Mode: INEX (Auto) ← Maintenance	0 A	C 🗢 ¥ 2018/07/25-11:53	
	General	Counters	Information	
	Serials			
	Module		E00700718026	
disid.	Blower board		0000FB025214	
	Blower		000018022036	
	Valve A		0000000017X	
and a second	Valve B		0000000017X	Ø (0°). M
	Battery		00109/231801	
[YLAD]	Motherboard		00FB025214	
Der Tenn Der G.N.CC	Pump		0018040062	
	Flow sensor		0018190137	
	Keyboard		127-217463	
	Versions	0		
		≡ 🖾 🖬		
			Counters Information E00700718026 0000FB025214 000018022036 0000000017X 00000000017X 00109/231801 00FB025214 0018040062 0018190137 127-217463	
-				
				(ˆ (△)) (ⓐ) (ⓓ)

- Launch EO-Toolkit
- Connect the EOVE-70 module to the computer by usb
- Click on "Connect"

🕘 eo-toolkit - main File				- o	×
			CONNECT 4	•	
				-	

- Click on the dropdown menu to display device information

🐻 eo-toolkit - main File							- ø ×
E0-VM70 31.00	MAIN WAVEFORMS TRACES	STREAMINGS	SET_INEX Ventilation mode	• الم	<	II >	DISCONNECT 4
Database	Item ;=+			Search a database item		E00700718026 E0-VM70	\bigcirc
MEAS_BAT_TEMPERATURE_S	24 °C	240	~ c		УО		

- Click on "Serials"

EO-VM70 31.00	MAIN WAVEFORMS TRA	ACES STREAMINGS	SET_INEX Ventilation mode	- Jr 1	L <		DISCONNE	ा 🖞 🌣 🛛
atabase T	tem 👻	=+		Search a database	eitem		700718026 ^{11/70} E0-VM70	,
EAS_BAT_TEMPERATURE_S	24 °C	240	~ c	+ - #		y0 Serial	E00700718026	
						MAC	00:04:3e:9b:bf:d5	
						CPU	C070000103 (722488d)	
						API	31.00	
						POWER	P150000301	
						GAUGE	5 2018-07-31T11:45:39.000Z	
							COUNTERS SEI	RIALS
						Battery	0	/
						Battery Ageing	100	/
						Machine	0.20 hours (12 minutes)	/
						Patient	0.23 hours (14 minutes)	/
						Pump Cycle	27	/
						Pump Time	0.20 hours (12 minutes)	/
						Turbine	0.17 hours (10 minutes)	/
						Valve A	102	/
						Valve B	98	

- ٥ × 0 SET_INEX <u>→</u> 4 < II → MAIN WAVEFORMS TRACES STREAMINGS DISCONNECT 🜵 🏟 📰 31.00 E00700718026 E0-VM70 đ, • =+ ÷ Type Serial MAC EO-VM70 E00700718026 00:04:3e:9b:bf:d5 c + - 🗈 🗹 24 °C MEAS_BAT_TEMPERATURE_S 240 y0 CPU API C070000103 (722488d) 31.00 POWER P150000301 GAUGE 2018-07-31T11:45:39.000Z 1 Battery Blower 000018022036 Blower Board 0000FB025214 Flow Sensor 0018190137 127-217463 Keyboard Mother Board 00FB025214 1 Pneumatic Block 000021-13/18 1 0018040062 Pump ı Change Blower serial Valve A 00000000172 / Valve B 0000000017X Blowe 000018022036 ок CANCEL Check in Information tab of Maintenance menu that the serial number changed is properly updated Mode: INEX (Auto) AC 🗢 🖇 2018/07/25 - 11:53 ← Maintenance General Counters Module Blower board Blower Valve A Valve B Pneumatic block
- Change the serial number required for the update and click on ok

6.6 Counters management

Operating time of critical components concerned by preventive maintenance must be updated in the Counters tab after a replacement.

- Launch EO-Toolkit
- Connect the EOVE-70 module to the computer by usb
- Click on "Connect"

🕘 eo-toolkit - main	- o ×
File	
	соллест 🖞 🏟 🖽
	Sampa

- Click on the dropdown menu to display device information

🝘 eo-toolkit - main File				- 0	× t
E0-VM70 31.00	MAIN WAVEFORMS TRACES	STREAMINGS	SET_INEX Vertilation mode	Ф Ф	
Detabase			Search a database item E00700718026	(Ľ
MEAS_BAT_TEMPERATURE_S	24 °C	240	✓ C + - ∎ 🗹 y0		

- Change the counter value required

eo-toolkit - main													-	ø	×
Fie E0-VM70 31.00	MAIN	AVEFORMS TRACES ST	REAMINGS	SET_INEX Ventilation mode	Ŧ	da l	• <		11			DISCONNECT	ψ	¢	
Database	ltem	↓ =+			Se	earch a databa	ise item			00700718026 0-VM70					^
MEAS_BAT_TEMPERATURE_s	3	24 °C	240	~ (, .	+ -	•	уO	Type Serial		D-VM70 D0700718026				
								<u> </u>	MAC		00700718026 0:04:3e:9b:bf:d5				/
									CPU		070000103 (72248	(8d)			
									API		1.00				
									POWER	P	150000301				
									GAUGE	5					
	Change Pump Cycle counter						Clock	20	018-07-31T14:42:4	0.000Z			/		
										COUNTERS		SERIAL	S		
			Pump Cycle						Battery	0					/ ii
			27						Battery Agei	ng 10	00				/ 1
					-				Machine	0.	20 hours (12 minut	tes)			Z 11
									Patient	0.	23 hours (14 minut	tes)			/ 1
							Pum	Pump Cycle	27	7				/ 1	
						OK CANCEL			Pump Time	0.	20 hours (12 minut	tes)			/ 1
									Turbine	0.	17 hours (10 minut	tes)			/ 1
									Valve A	10	02				2 II S
									Valve B	98	3		Che	inge Valve	A courte

NOTE: The battery ageing is measured by the battery gauge and updated after a full cycle of battery charge and discharge.

- Check in Counters tab of Maintenance menu that the value is correctly updated

Mode: INEX (Auto) ← Maintenance		€fAC 🗢	\$ 2018/07/25 - 12:10				
General			Information				
Patient	Machine	Battery cycles	Battery health				
0 h	0 h	0	100 %				
Valve A	Valve B	Pump time	Pump cycles				
87	84	0 h	23				
Turbine							
$\equiv \heartsuit$							

Technical Manual

MAINTENANCE OPERATIONS

7 Conditions and procedures of the EOVE-70 maintenance

7.1 Preventive maintenance requirements

Preventive maintenance procedures refer to maintenance which must performed regularly. These operations are performed according to the maintenance schedule defined by the manufacturers and **EOVE**.

Any other maintenance operation can be added depending on your own maintenance procedures.

Noncompliance with maintenance recommendations can result in loss of performance, excessive overheating or loss of some features and, in the long term, could undermine the potential sustainability of the ventilator.

7.2 Repair requirements in case of EO-70 SMD failure

In case of failure the device must be returned to the technical service, authorised, and certified by **EOVE**, to perform the troubleshooting and replace the defective components according to the component replacement procedures.

8 Cleaning and disinfection

8.1 Surface disinfection

Cleaning and disinfection of the device should be performed regularly and before any maintenance operation.

- Wipe the exterior of the device with a damp cloth using a mild cleaning solution.
- Inspect the connections and circuit adapters for any moisture or contaminants.
- Replace and clean as necessary using appropriate cleaning solutions.

For all circuit components and hoses, follow the manufacturer's recommendations for cleaning and maintenance.

8.2 Keredusy disinfection

Keredusy is a device allowed for the disinfection of the internal air-conducting parts of the EO70SMD when surface disinfection is not enough. As disinfectant, the Keredusy uses a solution composed of ozone and hydrogen peroxide which will be distributed by the air flow of the EO-70 SMD.



It permits to disinfect the returned EO70SMD in accordance to a validated procedure of Keredusy Manufacturer* before using the device again on patient.

Moreover, it limits the risk of contamination while the technical staff repairs or maintains the ventilator.

Keredusy can only be used on EO-70 SMD after a request of authorization given by EOVE sales department. Furthermore, a maximum number of 5 disinfections can be performed on the EO70SMD.

NOTE: the kit Keredusy EO70 (*ref SP-KRDUSY70*), mainly composed of the turbine, filters and various sealing rings, must be replaced after each disinfection.

* This procedure is under the responsibility of the Keredusy manufacturer. EOVE is not responsible of the disinfection performances

WARNING: As disinfectant the Keredusy uses ozone (O3) as well as hydrogen peroxide solution which will be distributed by the air flow of the respirator. The ozone & hydrogen peroxide solution used is a dangerous and toxic gas for the humans, animals and the environment. For such disinfection process, the rules of safety and cautions defined by the manufacturer shall be formally followed. We recommend minimizing Ozone & hydrogen peroxide solution release by ensuring the complete sealing of the Keredusy installation. Moreover, prevent inhalation by tools and solutions adapted to the risks. In general, it is suitable to control air concentration and use a gas vacuum system at the gas supply as well as general ventilation of the premises.

WARNING: Never perform Keredusy disinfection while EO-70SMD is opened and/or internal pneumatic circuit disconnected.

WARNING: After a Keredusy disinfection process, the waste of the ozone & hydrogen peroxide solution shall be managed in a way to reduce the impact and risk for the environment. The rules defined by the manufacturer shall be formally followed.

In case Keredusy disinfection is not possible, the following part must be replaced to reuse the device on patient:

- SP-PNEUBLOCK-001: pneumatic bloc and patient outlet
- SP-PNEUTUB-001: tubes and sealing rings
- SP-INSFLOWSENS-001 inspiratory flow sensor
- SP-KRDUSY70: Kit Keredusy EOVE-70

8.3 Guarantee of the cleanliness of the appliance

After each cleaning operation, the technician must affix a mark on the device to ensure the user that it is clean and ready for use.

9 Periodical controls

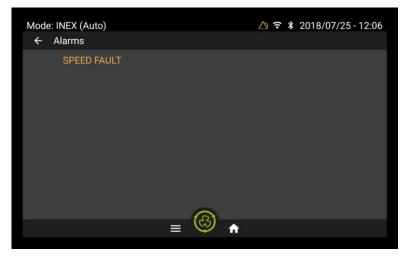
Periodical controls are recommended every year:

- Apply cleaning and disinfection recommendations
- Inspect the condition of the connections and circuit adapters for any moisture or contaminants
- Replace the two air filters (replace earlier if dirty or dusty)

Λ	CAUTION
	The air filters cannot be washed or reused.



• Control among the alarms & the events that nothing is unusual



- Check the status condition of the battery. Replace it if there is any sign of impacts or damage.
- Make the EOVE-70 SMD operate on battery mode and AC power source. Full charge the battery if necessary
- Check the software versions and update them if necessary

10 Preventive maintenance operations

The EOVE-70 should be regularly serviced by an authorized EOVE technician according to the following schedule. The SMD device will provide safe and reliable functioning for 10 years provided that it is operated and maintained in accordance with the instructions given in this manual. As with all electrical devices, if any problem arises with your EO 70 device, you should exercise caution, and have it inspected by an authorized EOVE technician.

10.1 Preventive maintenance schedule

		Back to technical	
Preventive maintenances	Periodicity		
		service	
Storage period	6 months	YES	
Cleaning and disinfection	6 months	NO	
Replacement of the air filter	1 year	NO	
Spare parts - battery storage (battery disconnected)	6 months	YES	
Replacement of internal filter and valves	2 years	YES	
Replacement of the battery (EOVE1 and EOVE3)	70 % ageing	YES	
Replacement of the pump	1000 hours	YES	
Dusting of EO-Display fan and heatspreader	2 years	YES	
Replacement of sealing rings and hoses	2 years (OPTIONNAL)	YES	
Replacement of internal flow sensor	4 years (OPTIONNAL)	YES	
Replacement of the solenoid valves	100 millions cycles	YES	
Replacement of the turbine	20 000 hours	YES	

10.2 List of required preventive maintenance

WARNING: EOVE is not responsible for the proper recycling of your maintenance waste. Recycling procedures must be strictly followed in compliance with laws in effect in the distributed country. Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability. Batteries, turbines, electro-valves, and other plastic parts must follow appropriate collection and recycling process in compliance with country regulations.

10.2.1 1-year servicing operation

- Cleaning and disinfection of the device exterior
- Replacement of the two air filters
- Perform periodical controls

10.2.2 2 years maintenance operation

- Replacement of internal filter and the 4 valves

OPTIONAL: Replacement of the tubes and sealing rings (depending on device operating time, cleanliness of tubes which must not be becoming yellow, number of disinfections performed).

10.2.3 4 years maintenance operation

- Replacement of internal flow sensor
- 2 years maintenance

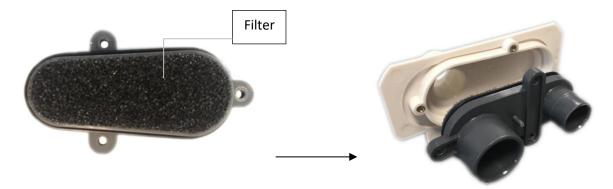
10.2.4 Other maintenance operation

- Replacement of the pump after 1000 hours
- Replacement of the turbine after 20 000 hours
- Replacement of the 2 solenoid valves after 100 million cycles

NOTE: It is recommended to replace the 2 solenoid valves as soon as one of them reaches the cycles limit.

10.3 Filter and valves

The filter and the 4 valves must be changed at least every 2 years.

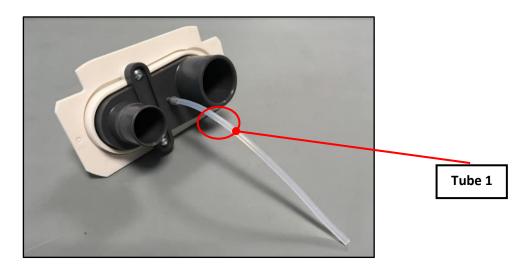


The filters can get clogged more quickly depending on the environment of use. Change the filter more frequently if necessary.

WARNING: The filter cannot be washed or reused.

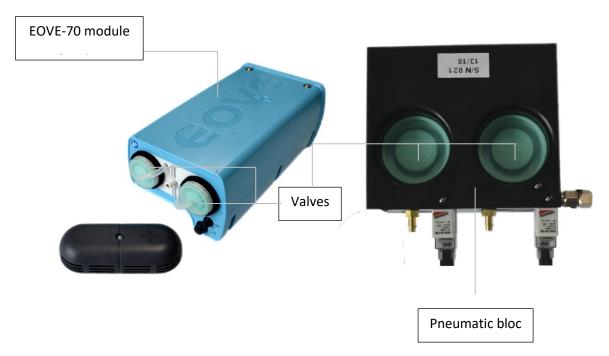
10.3.1 Control the pneumatic sealing of the patient circuit port

- Without any port plugged, apply a pressure on the tube 1.
- Check that the pressure drops



- Plug the various ports with Sealing Test Plugs (SP-SEALPLUG-001) and apply a pressure of 100mbar
- Check that pressure does not drop





10.3.2 Inhalation & Exhalation valves

10.4 Battery

10.4.1 Internal battery information

EOVE-70 SDM which reach a storage period exceeding six months could have undergone degradation on internal battery.

That is why we hardly recommend to fully charging the module at least every six months during a period of inactivity. That will avoid a total discharge and irreversible damages on the battery.

Note that the battery must reach a full charge before storing the device for

6 months.





Internal batteries EOVE1 and EOVE3 (*ref SP-INTBATT-001 and SP-INTBATT-002*) must be replaced when their ageing reaches 70%.

The battery ageing is available in the "Counters" tab.

WARNING: The disposal of defective batteries should be done in compliance with the laws in effect in your country. Lithium-Ion battery, when defective, might present explosion or combustion risks. Used batteries must be stored in closed ratified boxes with appropriate protection (like vermiculite) against impacts and overheating propagation.

Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

WARNING: Environmental accidents such as earthquakes, floods, hurricanes, tsunamis, and safety risks they can cause onto the device on the maintenance center, have no environmental impact except fire. Indeed, Lithium-Ion battery combined with heat exposure may increase fire and explosion risks, and release dangerous and toxic gas for the humans, animals and the environment. Store the batteries away from sun exposure and flammable materials, on a non-combustible surface.

WARNING: Spare parts batteries must only be provided by EOVE.

Batteries supplied as spare parts are shipped with a charge of 30%. They can be stored for 6 months if they are not connected.

In case of a battery replacement, the ageing resets after a full cycle of charge and discharge.

NOTE: After a discharge, we recommend to fully charge the battery before storing the ventilator. Even if the device must be serviced, that will save the battery life.

NOTE: We recommend using sometimes the ventilator on battery mode to increase battery life.

10.4.2 Configuration of the new battery

NOTE: The following operations detail the steps of the internal battery replacement.

WARNING: According to the S/N and the battery model, EO-Toolkit wizard performs the recovery or programming of the appropriate battery gauge.

- Connect the module to the computer by usb
- Start EO-Toolkit and click on "Connect"
- Click on the top left corner and select Module Repairs

olkit - home							0
Module Insight	HOME			DISCONNECT	ψ	墩	Ξ
Module Check DIAGNO	S	MEASUREMENTS	E0070071802 E0-VM70	26			~
Module Repairs	Start a diagnosis. START		20-4470				
- Select Cha	nge battery						
	the operation, click on Sta	art operation					
olkit - home						-	0
						-	
-toolkit					ψ	鐐	
E00700718026							
EO-VM70	D-there exists 00100/0016						
Denning executions	Battery serial: 00109/2318	01					
Repairs operations	1 Connection						
Change mother board	Plug an USB cable	between the computer and the ventilation module					
Change battery	Click next when do						
START OPERATION							
START OPERATION	NEXT						
Serial E00700718026	2 Battery type selection						
MAC 00:04:3e:9b:bf:d5 (BT33)	Battery type selection						
CPU C070000605 (741165a)	Enter the new battery serial	number					
API 39.01	Change battery						
API 39.01 POWER P150000400							
POWER P150000400	5 Battery configuration						

- Select the battery model

eo-toolkit - home			-	0	×
le					
eo-toolkit		ψ	鐐		
E00700718026 E0-VM70	Change battery			_	
EC-AMALO	Battery serial: 00109/231801				
Repairs operations	Connection				
O Change mother board					
Change battery	8 Battery type selection				
STOP OPERATION					
Serial E00700718026	the cove ce				
MAC 00:04:3e:9b.bf:d5 (8T33)					
CPU C070000605 (741165a)	€ EOVE3				
API 39.01	O EOVE1				
POWER P150000400					
GAUGE 5 (EOVE1)					
Clock 03/21/2022 2:57:43					
Station maintenance6666 PIN					
	NEXT				
	Enter the new battery serial number				
	Change battery				
	Battery configuration				

NOTE: The 2 batteries models have their own references. Refer to the *Appendix 4: Spare Parts List* to get the references.

- Enter the new serial number of the battery and click on Next

olkit	візсомнест 🖞 🎕	1
E00700718026 E0-VM70	Change battery	_
Repairs operations	Battery serial: 00109/231801	
O Change mother board	Ī	
Change battery	Statery type selection	
STOP OPERATION	Enter the new battery serial number	
Serial E00700718026 MAC 00:04:38:9b:bf:d5	Battey serial VCA2027199	
(BT33) CPU C07000605 (741165a)	NEXT	
API 39.01 POWER P150000400	Change battery	
GAUGE 5 (EOVE1)	Battery configuration	
Clock 03/21/2022 3:07:08 Station maintenance6666		
PIN		

NOTE: To get the correct serial number, refer to the labels of the batteries detailed in the *Appendix 3: Components serial numbers*

WARNING: Before the next operation, disconnect the ventilator from the AC power source.

- Replace the battery by the new one
- Plug AC to the ventilation
- Connect the ventilation module to the computer by USB

- 0 ×

Cli	ick on Next			_	0	>
loolkit			ψ	鐐		
	E00700718026	Change battery			_	
	EO-VM70	Battery serial : 00109/231801				
	Repairs operations	✓ Connection				
	O Change mother board					
	Change battery	Sattery type selection				
	STOP OPERATION	Senter the new battery serial number				
	Serial E00700718026					
	MAC 00:04:3e:9b:bf:d5 (BT33)	Change battery				
	CPU C070000605 (741165a)	Battery configuration				
	API 39.01	Configuring battery				
	POWER P150000400					
	GAUGE 5 (EOVE1)					
	Clock 03/21/2022 3:07:40					
	Station maintenance6666 PIN					

- During the next step, the wizard proceeds to the "configuring battery"

Var eo-toolkit - home File				-	0	×
i co-boollit			DISCONNECT	¢ 🕸	11	
t αr-fasilit E00700718026 E0-VAT0 Repairs operations ○ Change mother board ③ Change mother board ④ Change battery STOP OPERATION Serial E00700718026 MAC 00143 €900145 (01300 CPU C0700718026 MAC 00143 €900145 CPU C0700718026 CPU C070070718026 CPU C07007070707 CP	Battery serial: 00VCA2027199 Connection Battery type selection Criter the new battery serial number Change battery Battery configuration Configuring battery	Change battery	RECORDECT	* *		
	Info O Battery gauge updated	EOVE 👳 🖨 er-broßiel val.to	 develope 	d with ¥ by t		m

NOTE: During this operation, the battery gauge configuration is performed, and the battery ageing resets.

NOTE: A notification appears when the battery gauge update is successful.

10.5 Pump

The lifetime of the pump is 1000 hours and an alarm triggers when this duration is reached.



The pump counter is available in the "Counters" tab of Maintenance menu.

10.6 Turbine

The lifetime of the turbine is 20 000 hours and an alarm triggers when this duration is reached.



The turbine counter is available in the "Counters" tab of Maintenance menu.

10.7 Solenoid valve

The two solenoid valves must be replaced after 100 million cycles and an alarm triggers when this duration is reached.



Solenoid valves counters are displayed in the "counters" tab of the maintenance menu (valve A and valve B).

10.8 Inspiratory flow sensor

The inspiratory flow sensor can be replaced after 4 years of operating time depending on sensor conditions (dust, offset, water traces). We recommend checking cleanliness of its external filters and the accuracy of the measure by performing the 2-year maintenance operation with device performance controls.

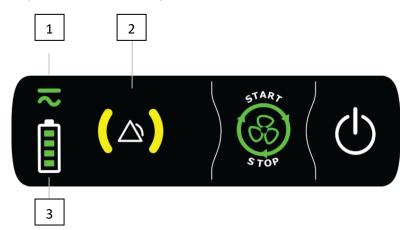


11 Curative maintenance

11.1 Alarms

11.1.1 Failure warning alarm

An alarm, lights on the keyboard and a warning message on the display screen warns the patient when there is a technical problem. The user must immediately contact a technician certified by EOVE and the repair should be performed as soon as possible.



- 1. Power source indicator
- 3. Battery level indicator

- 2. Keyboard alarm indicator
- 4. Interface alarm indicator



11.1.2 Alarms conditions

Alarm	Condition / Cause	Action
Speed Fault	Speed < 1000 rpm during ventilation	 Check CPU software version Check the connection between the blower board and the motherboard Check the inspiratory flow sensor conditions Control vent. Performances Replace the defective part according to your inspection
Supply Fail	Communication lost wit h power system	 Try to update PIC & CPU software versions Control device operation on the different power modes (battery and AC) Replace the motherboard if the alarm still triggers
Battery Fail	Battery doesn't charge properly or battery out of order	 Check software versions and update if necessary Replace the battery
CPU Fail	Internal failure	- Replace the motherboard
Check Settings	Discount all values by default (voluntarily)	 Restart the device and check that the alarm disappeared Control that settings have not been erased after a software update Set the patient configuration
Memory Fail	Lost setting value or Loss of memorized value	 Restart the device and check that the alarm disappeared If not, replace the motherboard
Prox. Fail	Sensor out of service	- Replace the motherboard
Keyboard fail	Button pressed longer than 20 seconds	 Check that the keyboard operates properly (LEDs + buttons) If not, replace the keyboard
Bat. Temp High	Battery temperature out of range during discharge	 Stop using the device on battery mode Let the SMD cool down for 1 hour Check PIC software version and update if necessary Check that the blower turbine isn't too high and so overheats the battery Start a new treatment Replace the battery if the alarm still triggers
Turbine Overheat	Blower temperature >80°C	 Check on SDM inlet/outlet that there is no obstruction Return the device to technical service Open SMD and check pneumatic block sealing Check that there is no leak on internal tubes Control vent. performances Replace the turbine if it still overheats

Turbine Fail	Blower temperature	- Check CPU software version
	Blower temperature out of range or temperature not in accordance with speed measure	 Check CPO software version Return the device to technical service Open SMD and check pneumatic block sealing Check that there is no leak on internal tubes Check the connection between the blower board and the motherboard Check the inspiratory flow sensor conditions Control vent. Performances Replace the defective part according to your inspection
Insp. Flow Fail	Sensor out of service (3 attempts to reinit sensor unsuccessful)	 Check software versions and update if necessary Replace the inspiratory flow sensor
Abs. Pressure Fail	Sensor out of service	- Replace the motherboard
High Pressure	Pressure >80 mbar	 Check on SDM inlet/outlet that there is no obstruction Return the device to technical service Check that the two solenoid valves operate properly Check that the inhalation/exhalation valves operate properly Check that there is no obstruction within the pneumatic block and tubes Check the offset value from EO-Toolkit Control vent. Performances Replace the motherboard if the problem still occurs
Bat. Charge Pause (T °>)	Temperature >45° or <0°c during charge	 Check ambient environment and let the SMD cool down in a cooler place Check software versions and update if necessary Replace the battery if the problem still occurs in charge
Pressure fault	Difference between pressure measured and pressure expected	 Check on SDM inlet/outlet that there is no obstruction Return the device to technical service Check that the two solenoid valves operate properly Check that the inhalation/exhalation valves operate properly Check that there is no obstruction within the pneumatic block and tubes Control vent. Performances Replace the motherboard if the problem still occurs
BATTERY < 20%	Battery < 20%	- Connect AC external power supply
BATTERY < 10%	Battery < 10%	- Connect AC external power supply
GAUGE COM. FAIL	Battery Gauge not functional	 Plug AC power Reboot the SMD If the problem still occurs, replace the internal battery If the problem occurs again, replace the CPU Board
Battery Maintenance	Battery ageing < 70%	 Replacement of internal battery during preventive maintenance
		00

Turbine	Turbine counter >	-	Replacement of turbine during preventive maintenance
Maintenance	20 000 hours		
Valve Maintenance	Valve counter > 100 millions cycles	-	Replacement of exhalation control valve during preventive maintenance
Pump Maintenance	Pump counter > 1000h	-	Replacement of pump during preventive maintenance

11.2 EO-Toolkit Event log

Love Toolkit		HOME LOG				DISCON	чест 🜵	繱
5 × E	Auto update 1/01/2099 12:00 AM Name	Category	۹ ۲					
DATETIME	NAME	CATEGORY	DETAILS	SUPPLY	VENT.			
2019/02/19 - 18:11:45	Alarm activated	Alarm event	BATTERY FAIL		35 î			
2019/02/19 - 18:11:27	AC back	System event			35			
2019/02/19 - 18:11:27	Device started	System event			35			
:019/02/19 - 18:11:27	Modification setting	Setting event	SET_SERIAL_Gauge_Version_0 change from 5 to 65535	ed	35			
019/02/19 - 18:11:05	Device stopped	System event		0	35			
2019/02/19 - 18:02:43	Device started	System event			35			
2019/02/19 - 17:33:04	LOG_AUTO_STOP_DEVICE	System event		۵	35			
019/02/19 - 16:59:05	Stop ventilation	System event		0	55			
2019/02/19 - 16:58:57	Start ventilation	System event		۵	35			
2019/02/19 - 16:12:52	Stop ventilation	System event		0	35			
2019/02/19 - 16:12:24	Start ventilation	System event		۵	35			
2019/02/19 - 15:53:15	Stop ventilation	System event		۵	35			
2019/02/19 - 15:53:08	Start ventilation	System event		0	35			
2019/02/19 - 15:46:36	Modification setting	Setting event	Mode changed from 1 to 0	0	55			
019/02/19 - 15:40:58	Event station detection	System event	Module removed from the station	0	55			
2019/02/19 - 15:40:24	Stop ventilation	System event		0	*			
2019/02/19 - 15:40:14	Start ventilation	System event		0	30 -			

Eave Toolkil v1.3.1 - developed with ***** by the Eove leam

11.3 Troubleshooting

11.3.1 Troubleshooting trees

Check alarms conditions (\$9.1.2) and the troubleshooting trees for additional information about the trigger of an alarm and the action to perform.

11.3.2 EO-Toolkit troubleshooting assistance

EO-Toolkit can provide technical assistance in case of alarm triggering. The diagnosis feature launches a scan among the event and look for all the alarms which triggered and their occurrence. Then it suggests some actions you might perform to solve the issue.

- Connect the EOVE70 SMD to the computer by usb and switch it on
- Start EO-Toolkit and click on connect
- Click on START to launch a diagnosis

🚾 eo-toolkit - home File				-	٥	×
File						
Eove Toolkil HO	LOG	DISCON	NECT	र्भ इ	٤ć	
	DIAGNOSIS	Iodule informations				~
Start a c	diagnosis. 💽 START	0-VM70				

- Check the alarm didn't trigger during some tests or is not an old alarm remaining in the event log
- Check the alarm reason is in accordance with device failure or the failure can be reproduced
- Check if the alarm is triggered by an issue different from the problem reported for the maintenance operation

📾 eo-toolkit - home File				-	٥	×
Eove Toolkit	HOME		DISCONNECT	ψ \$	\$	
	DIAGNOSIS	E00700718026 E0-VM70				^
	Start a diagnosis	Type EQ-VM70 Serial E00700718026				
		Serial E00700718026 MAC 00:04:3e:9b:bf:d5				/
	DETECTED ISSUES	UNDETECTABLE ISSUES CPU C070000201 (4cddd	14)			
	DETECTED ISSUES	UNDETECTABLE ISSUES API 34.00				
		POWER P150000400				
1 ALARM_BATTERY_FA	Equind 1	GAUGE 5				
	t charge properly or battery out of order	Clock 2019-02-20T16:30:3	9.000Z			1
Occurences:	Actions:	COUNTERS	SERIAL	S		
- 2019/02/19 - 18:11:45	- Check software versions and update if necessary	Battery Ageing 100			F	1 /
	- Replace the battery	Machine 0.42 h (25 minutes)				
		Patient 0.45 h (27 minutes)			P	11
		Pump Cycles 3407879			F	i /
		Pump Time 26432.88 h (3 years)			P	82
		Turbine 24648.83 h (3 years)				1 Z
		Valve A 14942324			F	1 /
		Valve B 14417929			F	i /

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- Perform the actions advised to fix the issue

11.3.3 Common SMD failure

Regarding EOVE-70 SMD operation, some failure associated to critical components such as the turbine, the motherboard or the battery must trigger alarms, but some breakdowns might not. These breakdowns can cause an unexpected noise or degrade SMD performances. This is a low priority incident but when the user notes something wrong about device operation, it is recommended to return it to technical service to be controlled and fixed if necessary.

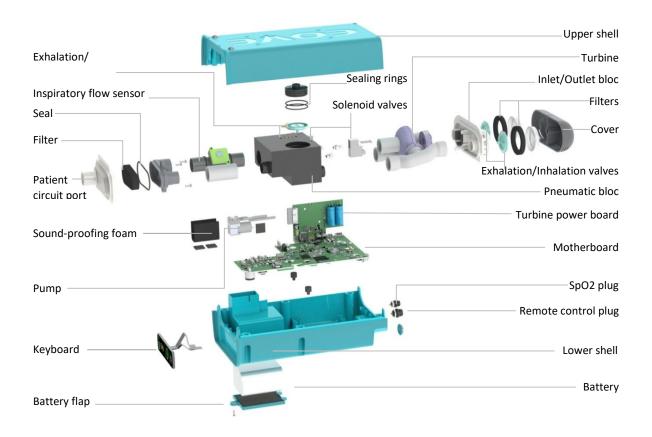
DESIGNATION	CAUSE	INCIDENCE	ACTION
Solenoid valve A electrical default	wires or connector damaged	Solenoid valve A can't operate. No positive pressure and unexpected noise during inhalation phase which can't be satisfactory.	Replace solenoid valve A NOTE : We recommend replacing both solenoid valve if you must change one.
Solenoid valve B electrical default	wires or connector damaged	Solenoid valve B can't operate. No negative pressure and unexpected noise during exhalation phase which can't be satisfactory.	Replace solenoid valve B. NOTE : We recommend replacing both solenoid valve if you must change one.
Solenoid valve A pneumatic default	tube disconnected, leak or exhalation valve blocked.	Device noisier during inhalation phase and exhalation valve doesn't operate. The EOVE-70 SMD can operate but turbine overheats quickly and need several minutes after treatment stop to cool down.	Replace the defective tube or reconnect it
Solenoid valve B pneumatic default	tube disconnected, leak or inhalation valve blocked	Device can't operate	Replace the defective tube or reconnect it
Error of inhalation/exhalati on valves control	tubes between inhalation/exhalation valves and pneumatic bloc mixed.	Device can't operate. Solenoid valves don't control the correct inhalation/exhalation valves	Refer to pneumatic drawing to connect properly the tubes on the right position
Pump pneumatic default	Pump backflow tube disconnected, not seal or pinched	Insufficient pressure during inhalation phase	Replace or reconnect the pump backflow tube
Pump electrical default	Pump electrical power disconnected or damaged (wires or connector).	Insufficient pressure to control the valves. Device doesn't operate properly	Replace the pump

12 EO-70 SMD module: Replacement procedures

12.1 List of components

12.1.1 EOVE-70 SMD module structure

Refer to spare parts list to get the references of components.



EOVE-70 SMD module architecture

WARNING: BEFORE ANY REPLACEMENT OPERATION, DISCONNECT THE BATTERY AND DISCONNECT THE EOVE-70 SMD FROM THE POWER SOURCE.

WARNING: AFTER REPLACING A COMPONENT, YOU SHOULD FILL THE NEW SERIAL NUMBER IN THE SMD MEMORY.

To ensure the proper functioning of the eove-70 secretion management device and the safety of the user and their entourage, the procedures described below must be strictly applied.

The device must be clean before any maintenance operation.

12.2 Air Filter

- Unscrew the cover and remove it
- Disconnect the two tubes from the inhalation/exhalation valves
- Remove the two old filters and replace them by new ones
- Connect back the tubes

WARNING: Pay attention to connect the correct tube on the right position

- Place back the cover and screw it



12.3 Battery

2

- Remove the module from the housing unit and turn it over.
- Remove the fixing screw (1) from the battery flap (2).
- Remove the battery flap and clean it.
- Remove the battery (3) and disconnect it from the extension cable.



- Place the new battery carefully in its housing with the battery facing in the correct direction (label providing battery technical data on the upper side. Label providing serial numbers on the opposite side).

1

- Position the cover and the fixing screw.
- Check the device is operational on internal battery and perform a battery cycle of charge and discharge.

WARNING: THE BATTERIES MUST BE HANDLED WITH CARE. CHECK THE CONDITION OF THE NEW BATTERY. DO NOT USE IF THERE IS ANY SIGN OF DAMAGE.

NOTE: The new battery must charge for 5 hours before use.

Check the condition of protective foams and replace if necessary.

NOTE: The EO70 SMD can be equipped by the battery model EOVE 001 (SP-INTBATT-001, yellow) or the battery model EOVE3 (SP-INTBATT-002, black) depending on the manufacturing batch.



3

The battery model EOVE3 (ref SP-INTBATT-002), colored black, is coming in substitution of the battery model EOVE1 (ref SP-INTBATT-001) to overcome its obsolescence.

The disposal of defective batteries should be done in compliance with the laws in effect in each country.

Batteries bought in spare-parts are sent with a charge of 30%. They can be stored for 6 months if they are not connected. In case of a battery replacement, the ageing resets after a full cycle of charge and discharge.

NOTE: After replacing an internal battery, you should fill the new serial number to the SMD memory during the "set serial numbers" test of the performance controls via EO-Toolkit

Refer to the labels of the batteries detailed in the Appendix 5: Components serial numbers

NOTE: After a discharge, we recommend to fully charge the battery before storing the device. Even if the device must be serviced, that will save the battery life.

NOTE: Keep the original EOVE-70SMD screw. Pay attention to not exchange it with the one from EOVE-150VNT which is different.

12.4 Module disassembly

Some maintenance operations require to open the EOVE-70 SMD. Be sure to strictly observe EOVE opening and closing instructions.

WARNING: Any operation which requires to open the module must be performed by a qualified technician.

12.4.1 Opening the module

- Remove the module from the docking station
- Turn the module over (lower shell (1) to the top), remove the filter cover and the 6 screws



- Turn the module over again (upper shell (3) to the top) by holding the two shells in position
- Open the module by removing the upper shell

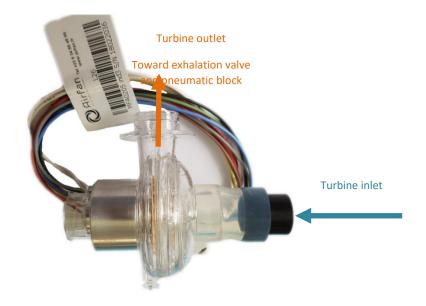
12.4.2 Closing the module

- Place back the upper shell by centering it on the lower shell
- Turn the device over by holding the two shells in position and replace the screws
- Place back the filter cover

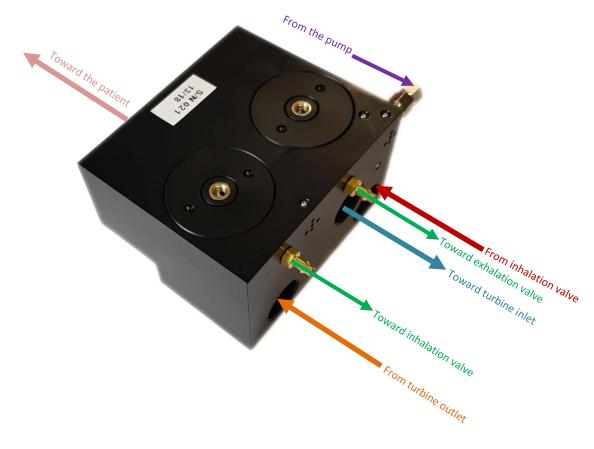
12.5 Pneumatic subassembly

Some maintenance operations require the removal and installation of the tubes. Be sure to strictly observe the installation and removal instructions of the various components by referring to the following instructions.

12.5.1 Turbine



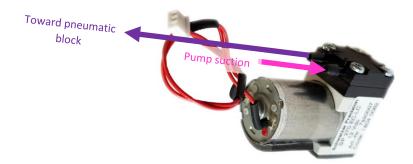
12.5.2 Pneumatic block



12.5.3 Patient circuit port



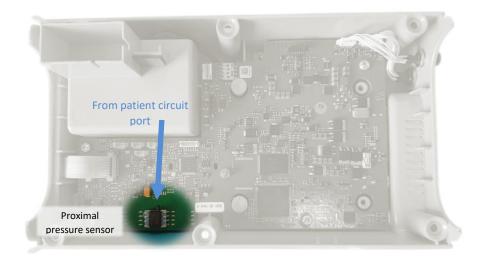
12.5.4 Pump

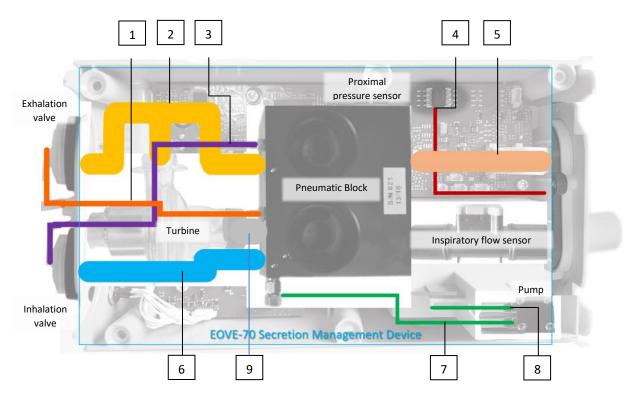


Toward pneumatic block Toward pneumatic block Toward pneumatic

12.5.5 Inhalation/exhalation valves block

12.5.6 Motherboard

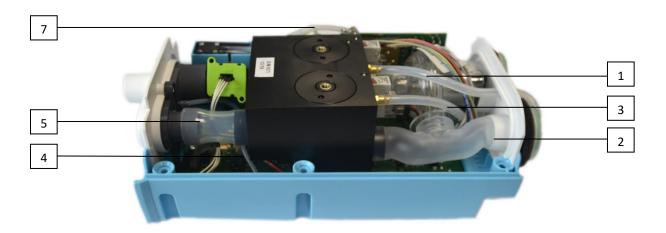




12.6 Pneumatic connections

Référence	Colour	Designation	Size
1		Silicone tube Ø 3x6mm	145mm
2		Curved tube of turbine output	3 connect. points
3		Silicone tube Ø 3x6mm	155mm
4		Silicone tube Ø 1x3mm	100mm
5		Tube of patient output Ø 15x21mm	45mm
6		Inhalation tube	2 connect. points
7		Silicone tube Ø 2x4mm	115mm
8		Silicone tube Ø 2x4mm	65mm
9		Straight tube of turbine input Ø 15x21mm	31mm

12.6.1 Left view of pneumatic block assembled



12.6.2 Right view of pneumatic block assembled



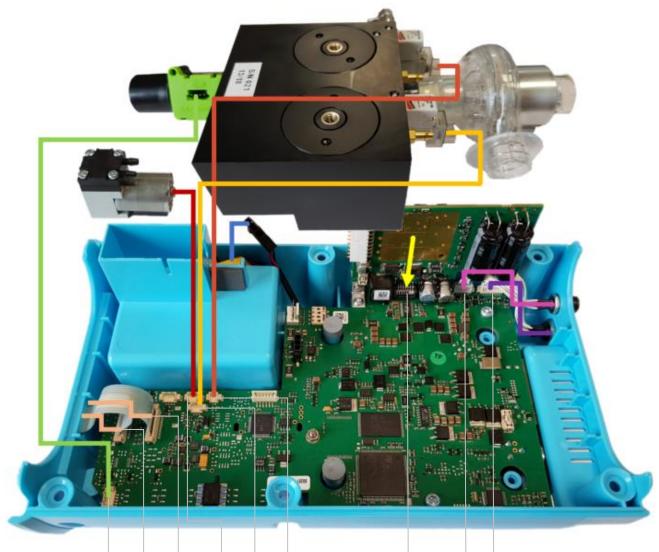
Pneumatic connections between:

1. Solenoid valve A and exhalation valve	2. Pneumatic block and exhalation valve
3. Solenoid valve B and inhalation valve	 Patient circuit port and proximal pressure sensor
5. Pneumatic block and patient circuit port	6. Inhalation valve and pneumatic block
7. Pump and pneumatic block	8. Pump suction

12.7 Electrical wiring

Some maintenance operations require the removal and installation of the cable harnesses. Be sure to strictly observe the installation and removal instructions of the various components by referring to the following instructions.

12.7.1 Motherboard electrical connections



					J
1	2	3	4	5	6

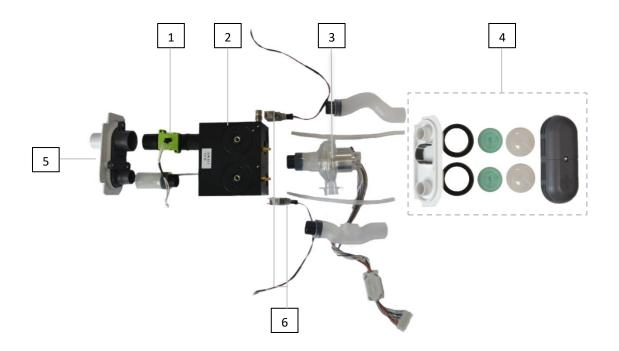
I	
7 8	9

Electrical connections to motherboard:

1. Inspiratory flow sensor	2. Keyboard LEDs
3. Keyboard buttons and battery indicator	4. Pump
5. Solenoid valve B	6. Solenoid valve A
7. Turbine board	8. SpO2 connector
9. Remote control connector	

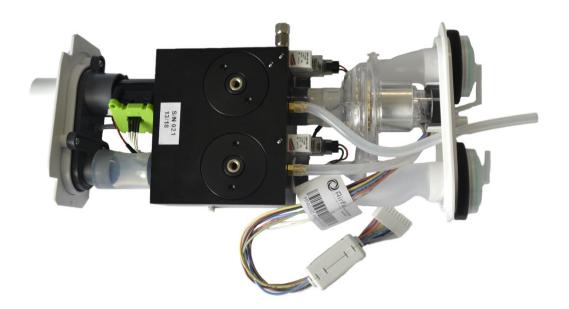
12.8 Internal pneumatic circuit

The internal pneumatic circuit is composed of the turbine, the inspiratory flow sensor, the pneumatic block with the two solenoid valves, the inhalation exhalation valves block and all the tubes.



1. Inspiratory flow sensor	2. Pneumatic block
3. Turbine	 Inhalation / exhalation valves block dismantled
5. Patient circuit port	6. Solenoid valves A & B

NOTE: For any replacement operation, it is recommended to remove the entire circuit

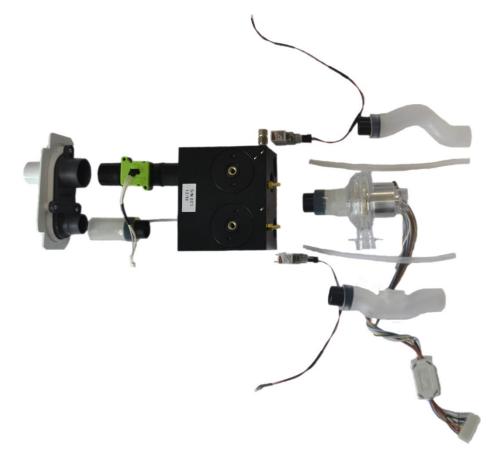


To remove the internal pneumatic circuit:

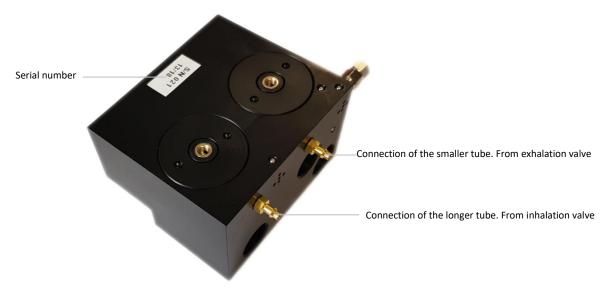
- Disconnect all the cable harnesses from the motherboard
- Disconnect the turbine from the turbine board the and the tube from the proximal pressure sensor on the motherboard

12.9 Pneumatic block

- Remove the internal pneumatic circuit
- Disconnect all the six tubes from the pneumatic block
- Remove the turbine and the inspiratory flow sensor
- Unscrew the two solenoid valves and remove them



- Replace the pneumatic block and note the serial number



- Position the two solenoid valves and screw them

- Connect the inspiratory flow sensor and pay attention to put it in the proper direction (arrow toward patient circuit port)
- Connect the turbine and the 6 tubes (pay attention to the two tubes connected to inhalation/exhalation valves. The longer is connected to Solenoid valve B and inhalation valve)

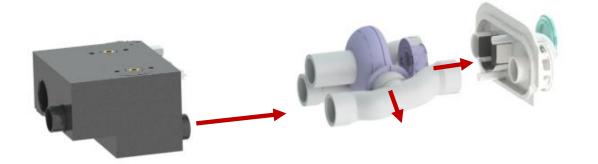
12.10 Turbine

- Disconnect the turbine from the turbine board

NOTE: Turbine serial number is written on the label affixed on turbine harness

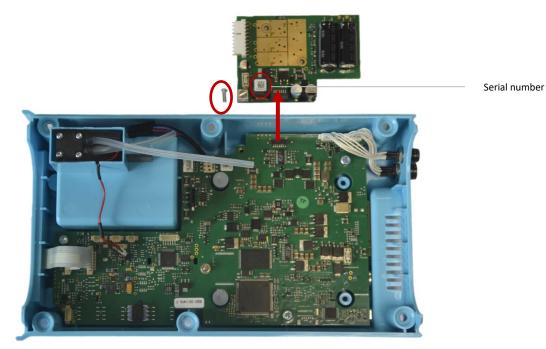
- Disconnect the turbine from the pneumatic block
- Remove the inhalation/exhalation valves block
- Disconnect the tube at the turbine outlet





12.11 Turbine board

- Remove the internal pneumatic circuit
- Disconnect the turbine electrical connection from the turbine board
- Unscrew the turbine board from the motherboard
- Disconnect the turbine board from the motherboard



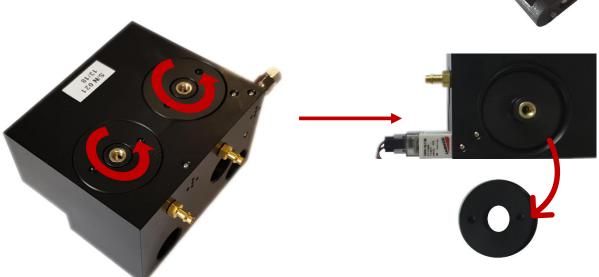
NOTE: Turbine board serial number is written on the label affixed on the front face

NOTE: Keep the original EOVE-70SMD screw. Pay attention to not exchange it with the one from EOVE-150VNT which is different.

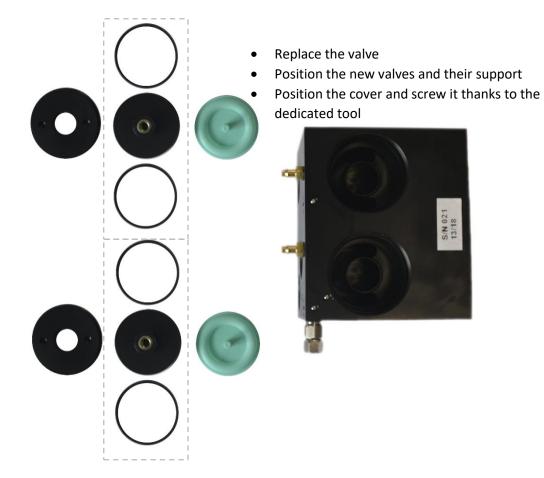
12.12 Inhalation / exhalation valves

12.12.1 Inhalation / exhalation valves installed in pneumatic block

- Unscrew the two covers on the top of the pneumatic block thanks to the dedicated tool and remove them

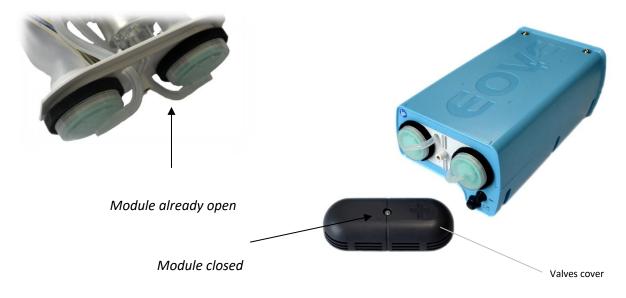


- Remove the valve support with its two sealing rings thanks to the dedicated tool, and the valve for each hole



12.12.2 Inhalation / exhalation valves installed in valves block

NOTE: Replacement of inhalation and exhalation valves at the rear of the device can be performed with or without a module opening.



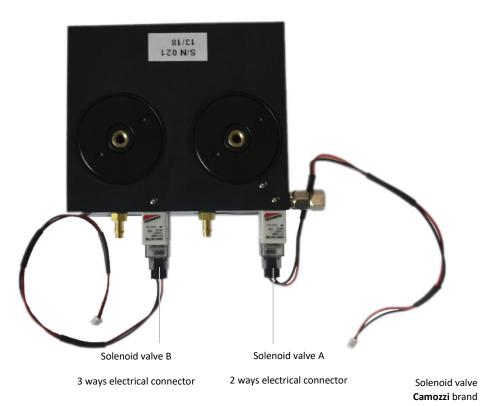
- Unscrew the cover and remove it if necessary
- Remove the tubes connectors
- Replace the valves



1. Inhalation / exhalation valves block	2. Air filters
3. Inhalation / exhalation valves	4. Tubes connectors
5. Cover	

12.13 Solenoid valves

NOTE: We recommend replacing both solenoid valves if the replacement of one of them is required.



- Disconnect the electrical harnesses from the motherboard
- Gently unscrew the solenoid valve. Pay attention to not damage the screw thread.
- Remove the solenoid valve
- Position the new solenoid valve
- Gently screw it and pay attention to not damage the screw thread
- Pay attention to the balance of tightening torque between the two screws to keep an efficient sealing
- Note the serial number of the new solenoid valve to update it in device memory
- Connect the electric harnesses (refer to electrical wiring \$10.7)

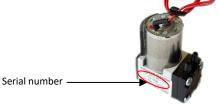




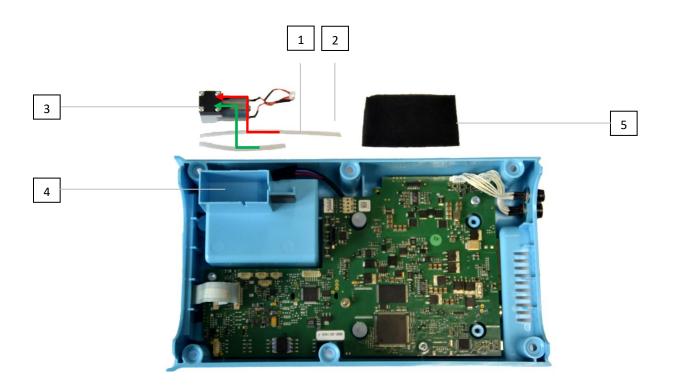
Solenoid valve Clippard brand

12.14 Pump

- Disconnect the electrical harness from the motherboard
- Disconnect the tube from the pneumatic block
- Remove the pump from its slot
- Note the serial number of the new pump

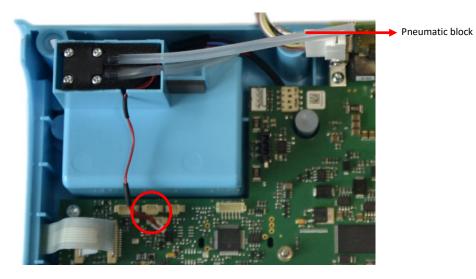


- Connect the two tubes (refer to the image below)



1. Pump suction	2. Pump backflow (outlet)
3. Pump	4. Pump slot
5. Sound-proofing foam	

- Position the sound-proofing foam within the slot
- Position the pump in its sound-proofing foam



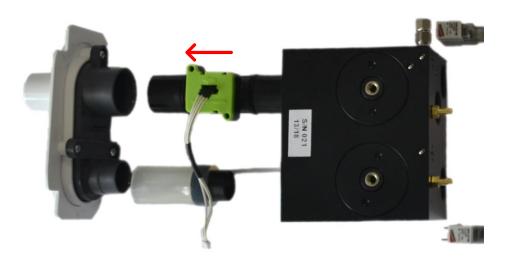
- Connect the electrical harness on the motherboard (refer to electrical wiring \$10.7)

- Connect the tube of the outlet (backflow) to the pneumatic block

NOTE: Position the two tubes so that block them in the shell groove

12.15 Inspiratory flow sensor

- Disconnect the electrical harness from the motherboard
- Disconnect the inspiratory flow sensor from the patient circuit port
- Disconnect the inspiratory flow sensor from the pneumatic block



Top view

- Note the serial number of the new sensor
- Pay attention to the direction (arrow toward the patient circuit port) and connect the inspiratory flow sensor to the pneumatic block



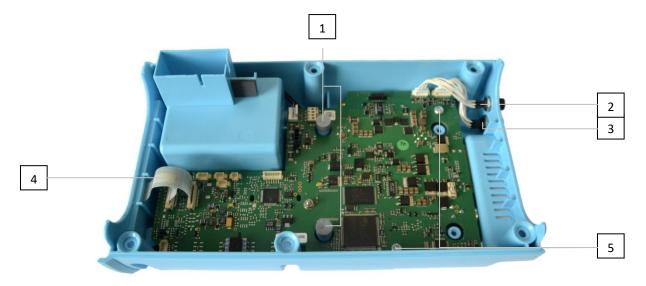
Front view

- Connect it to the patient circuit port
- Connect the electrical harness on the motherboard (refer to electrical wiring \$10.7)

12.16 Motherboard

6

- Remove the internal pneumatic circuit and the turbine board then disconnect the pump, the SpO2 and remote-control harnesses from the motherboard
- Disconnect the keyboard and remove the two turbine feet and the three screws

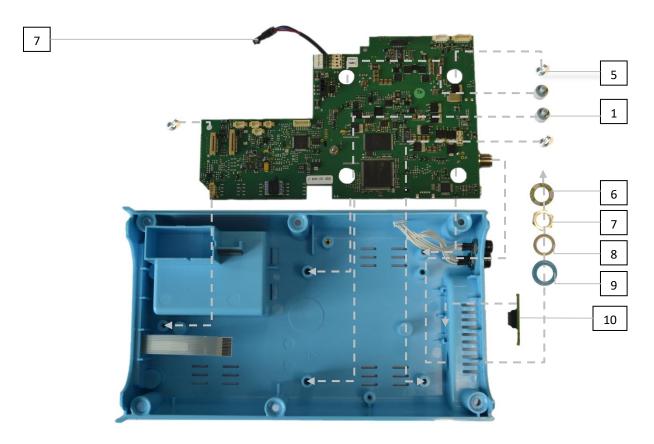


- Remove the insulating washer and the nut from DC connector



- Gently lift (A) the motherboard on the left side then pull it to the left (B). Pay attention to not coil the docking station connection card





1. Turbine feet	2. SpO2 connector
3. Remote control connector	4. Keyboard harnesses
5. Screws	6. Insulating washer
7. Nut	8. Washer
9. Lock washer	10. Docking station connection board

- Note the serial number
- Position the new mother board in its slot
- Place the washers and the nut of the power source connecter and gently screw it (no more than 1Nm)
- Put the three screws and the two turbine feet
- Connect the new motherboard (refer to electrical wiring \$10.7)
- Position the turbine board and screw it
- Position the internal pneumatic circuit

NOTE: After replacing the motherboard, update the serial numbers and counters values of all the other components.

12.17 Keyboard

- Disconnect the keyboard from the motherboard
- Remove the keyboard from the lower shell
- Note the serial number of the new keyboard
- Stick the new keyboard on the lower shell
- Connect it to the motherboard

13 Performances controls via EO-Toolkit

13.1 Materials requirement

To perform an EOVE-70 SMD final controls, use the materials in the following list or equivalent.

MATERIAL	PROVIDER	REFERENCE	SPECIFICATIONS	REQUIREMENT
Flow analyzer	IMT medical	PF300 / Citrex H4	Air BTPS mode	Necessary
EO-Testing cable if final control is performed via EO-Toolkit	EOVE	SP-TESTCBL-001	N/A	Necessary
Power Supply	Aim-TTi	EX4210R	42V / 10A	Necessary
Aplus precision test lung	GaleMed	6011	RP5	Necessary
Circuit test adulte	Intersurgical	Ref 5804000	D22mm / L=180cm	Necessary
Screwdriver T10	N/A	N/A	T10	Necessary
SpO2 sensor	Nonin	8000AA	N/A	Necessary
Xpod cable	Eove	EO-SPO2CBL	N/A	Necessary
Remote control	Eove	EO-70FSWITCH	N/A	Necessary



WARNING: This chapter details how to run an automatic test via EO-Toolkit. Nevertheless, the following list of controls is non-exhaustive. Refer to the instructions listed in the popups which appear during the test. All the tests must pass to consider the device in accordance with specifications.

13.2 Performance controls

Full performance tests must be performed after each preventive maintenance operation which requires the opening of the ventilation module, or after each repair. It should be performed at least once a year and/or according to your internal quality policy.

- Connect the EO150 ventilation module to the computer by usb
- Connect the flow analyser with the **appropriate cable** to another usb port of the computer

NOTE: EO-Toolkit is only compatible with flow analyser PF300 and Citrex H4. If not possible to use one of these flow analysers, refer to the manual process of performance controls.

NOTE: To run the automatic test, the flow analyser must be connected on the appropriate port using the dedicated cable. Refer to the spare parts & tools list to get the reference.



PF300 Cable ref: SP-TESTCBL-001



CITREX H4 Cable ref: SP-TESTCBL-002

NOTE: Connect the testing cable (*SP-TESTCBL-001*) to the Flow Analyser PF300 RS232 port.



13.2.1 EO-Toolkit Configuration

NOTE: Full installation process is detailed in appendix 2.

- Launch the EO Toolkit
- Click on settings

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File	
: Eave Toolkit	CONNECT 4 (8) E
	Settings

• Configurate/check the different settings before beginning a new performance control

1	[2		3	
Settings					
CONNECTION	CHECK MODULE	FIRMWARE	DATA	LOG	STREAMING
Tester name	Tester	e-mail			
Mister Blue		sav@eove.fr			
Check type category Customer					
Instruction reference E070 Technical n	nanual rev DB				
Test reports directory C:\Users\ Miste	r Blue \Documents\New f	older			
Flow analyzer USB port					
Enable sound					
4	5	6			

1- Technician	2- User e-mail address
3- Documentation associated	4- On/Off test sound
5- Choice of Flow Analyzer USB port (must be connected first)	 6- Destination folder to save Process Value tests

• Select the software package required

Settings

CONNECTION	CHECK MODULE	FIRMWARE	DATA	LOG	STREAMING
Package file for EO-VM70 C:\Users\Lucas.d	elplan\Downloads\eo70	app-1.6.3-C07000040	1-P150000400-fixed.eopkg	I	
Package file for EO-VM150 D:\eo150app-2.1.	1-C150000606-P150000)400.eopkg			

- Click on OK to save the configuration
- Select Module Check

Ver ec-toolkit - home File	- Ø X
: Earre Toolkit	CONNECT & B
ka e-tooliit - home File	– Ø X
> Module Insight	CONNECT 🌵 🎲 🖽
Module Check	

• Choose the performance control required then click on START CHECK

🕼 eo-toolkit - home				-	o ×
File					
: Eove Toolkit				CONNECT 🌵	¢ 🗉
	NOT RUN		E070 Technical manual rev D8	B Mister Blu	ue
Device type Check type	: 🕟 G	Generate module	snapshot		
 eo70 Customer final check 	: 🕞 U	Update firmware	3		
		Set clock			
o eo150 O Customer endurance che	eck 🗄 🕑 S	Set serial numbe	\$		
START CHECK	: 🕞 т	Test			
GENERATE REPORT		:)	LEDs and keyboard		~
GENERATE REPORT		:)	Electrical interfaces and communication		~
		:)	Security and blower performances		· · ·]
		:)	Performance		~
	: 🕞 P	Prepare for endu	ance		

• Select the test and click on start

🖙 eo-toolkit - home				- a ×
File				
: Eove Toolkit				СОЛЛЕСТ 🌵 🎊 🏬
	NOT RUN	EO70 Technical manual rev DB -	Checking an EO-VM70 device	e Mister Blue
Device type Check type	: 💿 Genera	rate module snapshot		
 eo70 Customer final check 	🗄 💽 Update	te firmwares		
	🗄 💽 Set clo	lock		
O eo150 O Customer endurance che	🗄 💽 Set se	erial numbers		
STOP CHECK	: 💽 Test			
GENERATE REPORT	: 💽	LEDs and keyboard		~
GENERALE REPORT	: 💽	Electrical Interfaces and communication	n	~
	: 💽	Security and blower performances		~
	: 💽	Performance		~
	🗄 💽 Prepar	are for endurance		

NOTE: If the full performance controls is required, start from the first test "generate module snapshot".

If only ventilation performance controls are expected, start the test from "Security and Blower performances".

It is possible to play a unique test by clicking on Start Single Activity

🖙 eo-toolkit - home File					- 6	0 ×
: Eove Toolkit					соллест 🜵 🀯	
		NOT RUN	E070 Technical manual rev DB	Checking an EO-VM70 device	e Mister Blue	
Device type	Check type	🗄 💽 Generate mod	lule snapshot			
eo70	Customer final check	: 💿 Update firmw	ares			
O eo150	O Customer endurance check	E Set clock	ibers			
	STOP CHECK	: • Test				
ſ	GENERATE REPORT	: 💿	LEDs and keyboard			~
l	CENERATE REPORT	: 💿	Electrical interfaces and communication	on		~
		: 💿	Security and blower performances			~
		: 💿	Performance			~
		Prepare for er	durance			

WARNING: After a maintenance operation, full performance controls are necessary.

13.2.2 Generate a snapshot

The first test permits to generate an events log file and a snapshot of device condition including software versions, components S/N and counters.

Name	Date modified	Туре	Size
📴 EO0700718026_logs_2020-06-08-11-16-04.xlsx	6/8/2020 11:16 AM	Feuille de calcul M	169 KB
EO0700718026_snapshot_2020-06-08-11-16-04.json	6/8/2020 11:16 AM	JSON File	3 KB

<u> </u>	007007	18026_sr	apshot_	202	0-06-08	-11-16	-04.jso	n - Not	epad	
ile	Edit	Format	View	He	lp					
	"ider	tifica device apiVer apiMir	ation Type sion		{ "EO-V "36",					
		apimir	lorver	.21	on :	00				
	}, "	al": '		-00	10000					
	"seri	als": venti. blower blower valve/ valve/ valve/ pneuma cpuSo commAg mother pump" flowSo	{ lation PBOard PBOard A": "(A": "()"()"()"()"()"()"()"()"()"()"()"()"()"	hMo d":: 000 000 000 000 000 000 000 000 000	dule" "000 01802 00000 00000 k": " 109/2 crsion Versi n": " "00F 40062	: "EC 0FB02 2036' 017X' 00002 31801 ": "C on": 36", B0252	25214 , , 21-13 [", 20700 "P15 214",	/18" 0040:	, 1",	
		'keyboa 'mac":	ard":	"1	27-21	7463'				
		gauge				ς,				
	},									
		"po	nt": alue": ositio	: 1 on"	.3108 : 109 NIT_H	,	3333	333,		
	:	machin "va "po "un batten "va	alue" ositio nit": ryAge: alue"	: 1 on" "U ing : 1		, OUR"	55555	556,		
					NIT_P		IT"			

This test can be played alone when the device is returned for servicing and a save is necessary before performing any operation.

13.2.3 Update software versions

- Connect the module to the external power source
- Follow the various information which appear in the pop-up

i eo-toolkit - home File		- 0 ×
: Evve Toolkit		соннест ф 🕸 🕕
	PASS (incompleto) D8 - Checking an EO VM70 device	Mister Blue
Device type Check type		
eo70 eo70 Customer final check	🕴 🔳 Update firmwares Starting firmware update	
G care G careful marched	1 💿 Set clock	
O eo150 O Customer endurance check	1 💿 Set serial numbers	
STOP CHECK	j 🕖 Test	
	2 O LEDs and keyboard	~
CRAREATE REPORT	Electrical Interfaces and communication	~
	E Security and blower performances	~
	10	~
	: O Prepare for end Firmware update	
	1. Connect an USB cable from the computer to the module 2. Connect AC external power supply to the module	
	OK CANCEL	

NOTE: During performance controls, software update operates by package. If that test is run, both VM software will be updated, the PIC and the CPU.

🖙 eo-toolkit - home File						- 1	o >
: Eove Toolkit						DISCONNECT 🜵 😫	
	E00700718026 E0-VM70	PASS (in	complete)	E070 Technical manual rev DB	Checking an EO-VM70 device	e Mister Blue	
Device ty	rpe Check type	:)	Generate module s	napshot			Î.
eo70	Customer final check	1 B (1 B (Update firmwares		Checking CPU and POWER versions		(
			Set clock				
O eo15	50 O Customer endurance check	: 🕑	Set serial numbers				
	()	: 🕞	Test				
	STOP CHECK		: 🕑 LE	Ds and keyboard			~
	GENERATE REPORT		: 🕑 El	ectrical interfaces and communicatio	n		~
	Type EO-VM70		: 🕑 Se	curity and blower performances			\sim
	Serial E00700718026		: 🕑 🛛 Pé	rformance			\sim
	MAC 00:04:3e:9b:bf:d5 (?)	:)	Prepare for endurat	ice			
	CPU C070000401 (f3fb3c5)						
	API 36.00						
	POWER P150000400						
	GAUGE 5						
	Clock 2020-06-08 11:30:09						
	Station maintenance6666 PIN						

NOTE: If the update fails, check the usb ports in settings, restart the EO150 VM and try the test again.

CONNECTION CHECK MODULE	FIRMWARE	DATA	LOG	STREAMING
List USB Ports SCAN				
Main USB port (CPU) Secondary USB port (Power)				
Auto Select API descriptor file				
hard delet in Factorized the				
			OK	EXPORT IMPORT

WARNING: Use 2 consecutive USB serial COM ports lower than 10.

13.2.4 Test of the LEDs and the keyboard

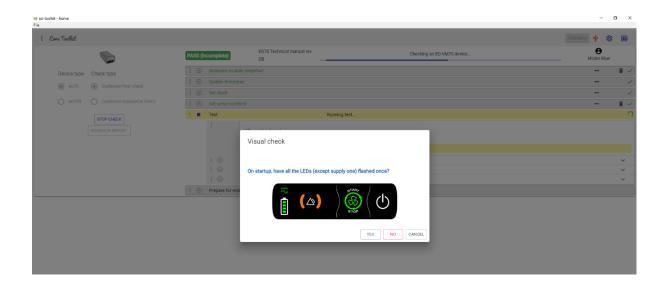
Main purpose of this test is to control that the keyboard operates properly.

Every time an action is required by the technician, a popup appears and details the operations to perform in the proper order.

Follow the instructions step by step. If a test fails, stop the ventilation, restart the EO70 SMD and try the test again.



Popups with instructions in blue expect the operator to check something; LED, buzzer, etc..



13.2.5 Electrical interfaces and communication

This test permits to check that the ventilation module is operating correctly on the different power modes:

- AC from the external power source
- Battery mode
- DC power from the external battery
- When the module is inserted in the EO-Display

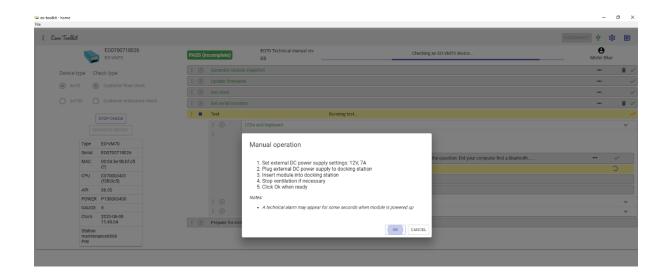
Operation on 12VDC external power source

During this test, the external power supply can be replaced by an external battery EO-BATPCK

OR





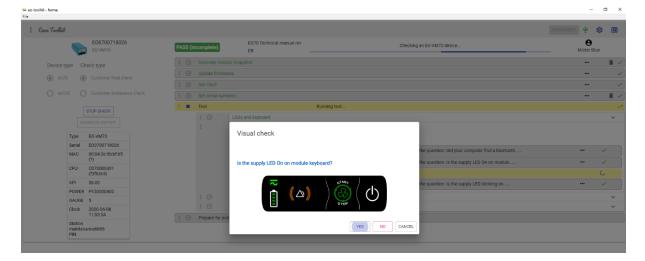


• Check the device is operating on DC power mode

🖙 eo-toolkit - home File								-	0 ×
: Eove Toolkit							DISCONNECT	, ¢	
		E00700718026 E0-VM70	PAS	S (incomj	plete)	E070 Technical manual rev Checking an E0-VIATO Gevice		9 er Blue	
Device type	e Che	ck type							1
Contraction of the second							-		
O eo150									1
		TOP CHECK	1.1	Test	t	Running test			
					D LE	Ds and keyboard			~
						Visual check			
						VISUAI CITECK			
-						the question: Did your computer find a bluetooth			
Fie Construction Field Fiel					Is the supply LED On on module keyboard?				
c	• CONDECTION CONTOCTION • Control Control • Control Control • Control • Control								
A	API S	36.00				STAR			
					•				~
					•	STOP			~
c				Prep	pare for end				
n	naintenan	ce6666				VE NO CANCEL			

Operation on AC power source

• Control the device is charging its internal battery while inserted in the EO-Display



Operation on internal battery

• Disconnect the external power source from the EO-Display and check that the device is operating correctly on this power mode

: Eove Toolkit	e							\$	
	6	E00700718026	PASS	incomplete)	E070 Technical manual rev DB	Checking an EO-VM70 device	e Mister i		
	type Cl	neck type							ĩ ~
eo7									
0 607									
									ī ~
				Test	Running test				
		STOP CHECK							~
	Туре	EO-VM70			Visual check				
	Serial	E00700718026				the question: Did your computer find a bluetooth			
	MAC	00:04:3e:9b:bf:d5 (?)						~	
	CPU	C070000401			is the supply LED blinking on module keyboard?	the question: Is the supply LED On on module			
	API	(f3fb3c5) 36.00			STAR	the question: Is the supply LED On on module			
		P150000400							
	GAUGE								~
	Clock	2020-06-08 11:53:54		: Prepare for en	STOP STOP				~
	Station mainter PIN	ance6666		Prepare for en	YES	NO CANCEL			

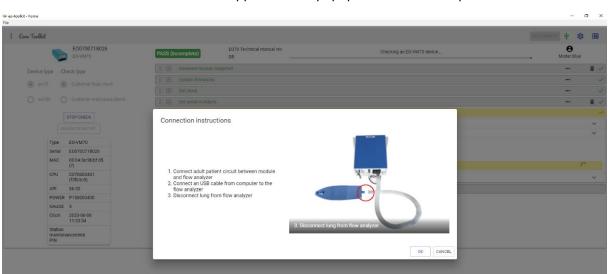
13.2.6 Performance and turbine tests

• Connect a short adult circuit (60cm) between the EO70 SMD and the flow analyser

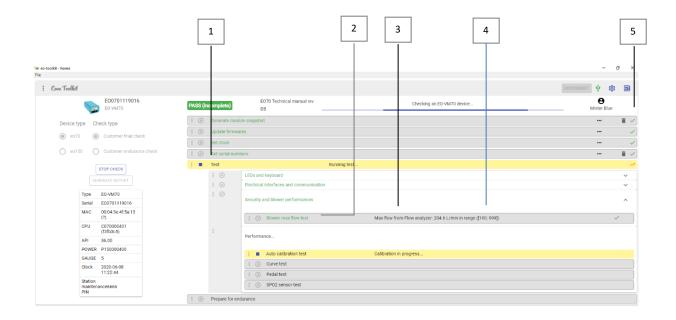


• Connect a 1L adult test lung to the outlet of the flow analyser





• Follow the instructions which appear on the popup to check turbine performances



1- Test suite	2- Unit test
3- Measure	4- Range
5- Test result	

• Calibrate step by step according to EO-Toolkit popup

Ver eo-toolkit - home File			- a ×
: Evre Toolkit			DISCONNECT 🖞 🕸 🖩
E00701119016 E0-VM70	PASS (incomplete) DB E070 Technical manual re	Checking an EO-VM70 device	e Mister Blue
Device type Check type			🔳 🗸
eo70 Customer final check			 \
			••• 🗸
O eo150 O Customer endurance check	E Set serial numbers		
STOP CHECK	Manual operation		A.
GENERATE REPORT	manaar operation		× .
			× .
Type E0-VM70 Serial E00701119016			× .
MAC 00:04:3e:4f:5a:13			
(?) CPU C070000401			0
(f3fb3c5)	1. Unseal patient circuit		
API 36.00			
POWER P150000400 GAUGE 5			
Clock 2020-06-08		1. Unseal patient circuit	
13:44:30 Station		(
station maintenance6666 PIN	Click Yes when ready (No to abort)		
		YES NO CANCEL	

• Continue the test step by step following the operations expected by EO-Toolkit

NOTE: In case of failure, if additional information about a test result are necessary, click on to display the measures

🖙 eo-toolkit - home File						-	6 ×
: Eove Toolkil						різсоннест 🖞 🚳	
	E00701119016 E0-VM70	FAIL		E070 Technical manual rev DB	Checking an EO-VM70 device	Hister Blue	
Device type	Check type	: 💿	Generate mod	ule snapshot			1
		: •	Update firmw	ares			~
eo70	 Customer final check 	: •	Set clock				~
O e0150	O Customer endurance check	: •	Set serial nun	ibers			i <
		: •	Test				×
	STOP CHECK		: •	LEDs and keyboard			~
	GENERATE REPORT		: •	Electrical interfaces and communication			~
ту	pe EO-VM70		: 💿	Security and blower performances			~
Se	erial E00701119016		: 💿				
M	AC 00:04:3e:4f:5a:13 (?)			Performance			^
CF	PU C070000401 (f3fb3c5)			: () Auto calibration test	Calibration was successful	~	~)
AF	PI 36.00			: Curve test	Vti from Ventilation module: 899 mL in range ([837; 1023])	()	×
PC	OWER P150000400			: 💿 Pedal test		• / Vti from Ventilation module:	
	AUGE 5			I () SPO2 sensor test		 vti from ventilation module: range ([837; 1023]) 	899 mL in
Cle	lock 2020-06-08 13:44:30		Prepare for er			 Vti from Flow analyzer: 862 n range ([837; 1023]) 	
Sta mi PII	ation aintenance6666 N	: •	Prepare for er	igurance.		Peak flow from Ventilation m 155.3 L/min in range ([150; 999 Peak flow from Flow analyzer	9])
						 Feak now from Flow analyzes L/min not in range ([150; 999]) Peak pressure from Flow ana 62.3 mBar in range ([53; 67]) Plateau pressure from Flow at 	alyzer:

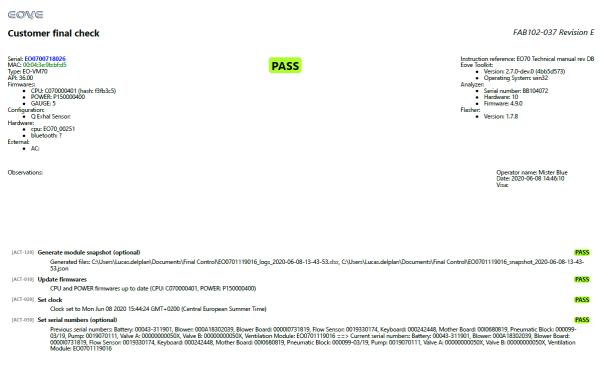
😝 eo-toolkit - home File			- o ×
: Eave Toobhil			олсоннаст ф 🕸 🖩
E00700718026 E0-VM70	PASS (incomplete) E070 Technical manual rev DB	Checking an EO-VM70 device	Hister Blue
Device type Check type exercise control of the con			•• •• •• •• ••
eo150 Costomer endurance check	1 () Set block		
STOP CHECK CENERATE REPORT	Manual operation		~
Type EO-VM/70 genal E00790718020 MAC 000 43 eVb bit d5 CPU C070000401 (1010000000000000000000000000000000000	 Use the pedal to run an exhalation and an inhalation. Click Ok when done. 	I. Use the pedal to run en exhalation and on inhalation. Click OK	× ×

• Connect the accessories (footswitch remote control, SpO2 sensor) as required

At the end of the test, a Process Value report is generated, and the device is set into endurance configuration.

	🔺 Warning 🔺
he module is	ready for endurance test. You can:
2. Generate	ther module: Be carefull, this will erase all current results report: This will generate a report with the current results This will ony close this popup, keeping the current results

NOTE: A report can be generated anytime during the test



13.2.7 Battery charge control

- Connect the module to AC power and check that the charge is in progress on the battery indicator (keyboard
- Connect the EO70 SMD to EO-Toolkit to verify that the charge is complete before 8 hours.

🖙 eo-toolkit - home File					- 0 ×
: Eove Toolkit					CONNECT 🔿 🏟 🔳
	5	NOT RUN	EO70 Technical manual rev DB	Checking an EO-VM70 device	e Mister Blue
Device type	Check type	: Test		Connecting to module	0
eo70	O Customer final check	I	Endurance		
O eo150	Customer endurance check		Battery charge duration test	Starting test	
	GENERATE REPORT	: ③ Reset to factor	ry defaults		

At the end of data analysis, EO-Toolkit generates a second report with the results of the endurance test.

14 Manual performance controls

14.1 Inspection sheet

After each maintenance operation, we recommend performing a final control of the EOVE-70 SMD. Refer to the following procedure and fill the inspection sheet below after each operation (full size available in annex 3).

	INSPECTION	SHEET EO	VE-070	SAV100-12 RE A
Serial number:	Customer: Intervention:			
DOCUMENTS/APPEARANCE		Result	Comm	ents
Verification of work sheet				
General appearance inspection: filet, co	wer, shell, fastenings			
Labels: power source, USB, SpO2, remo	te control, SN			
OP1: SOFTWARES CONTROL	s	Result	Comm	ents
PIC software version				
CPU software version				
Interface software version				
OP2: LEDs & KEYBOARD (ba OP2-1: 28VDC/4A: Lighting control of th battery LED	e LEDs power source and the red	Result	Comm	ents
OP2-1: Control of the button ON/OFF & LED	control of the alarm LED, ventilation			
OP2-2: Connect the battery				
OP3: ELECTRICAL INTERFACT WITH DOCKING STATION		Result	Comm	ents
OP3-1: 12VDC/7A: Functionning on extension) & lighting indicator				
OP3-2: EOVE Power supply: Functionnir docking station) & lighting indicator	ng on AC power source (outside the			
OP3-3: Functionning on internal battery	(into the docking station) & lighting			
indicator				
OP3-3: Switching from battery mode to				
OP3-3: Communication with docking st			_	
OP4: PERORMANCE CONTRO		Result	Comm	ents
OP4.1: Peak Flow (monitored on int				
OP4.1: Tidal volume (monitored on				
OP4.1: SpO2 (monitored on interfac				
OP4.1: P.peak (monitored on Flow a				
OP4.1: Pplateau (monitored on Flow OP4.1: PF Exp. (monitored on Flow : 5 ±10%				
OP4.1: Vti: 880 mL ±10%				
OP4.2: Trigger control				
OP4.3: Remote control operation				
OP4.4: Turbine performance control	ls: Flow 200 L/min ±10%			
OP5: BATTERY CHARGE CON	ITROL	Result	Comm	ents
OP5-1: Control that the battery is fully o	charged < 8h			
OP6: DOCKING STATION		Result	Comm	ents
Setting of clock / date / language				
General appearance inspection: shell, d	isplay screen			
Labels: power source, serial number				

14.2 OP1: Software controls

Procedure from TOOLKIT

- -
- Launch EO-Toolkit software
- Connect the EOVE-70 module to AC power
- Connect the EOVE-70 module to the computer by usb

- Click on Settings

iar eo-toolikt - home File	- 5 X
: Eave Toolkit	солнест 🕂 🔞 🗷
	Settrop

- Go on "Firmwares" tab

eo-loolkil						CONNECT 🌵 🎊 🔠
Settings						
CONNECTION	CHECK MODULE	FIRMWARE	DATA	INTERFACE	LOG	STREAMINGS
Package file for EO-VM70 C:\Users\EOVE\Documents\Sc	oftware E070\eo70-app-v2.0.0-C07000	0401-P150000400-5.eopkg				
Package file for EO-VM150						
۱						OK EXPORT IMPORT

- Select the software package required for the update.

Settings						
CONNECTION	CHECK MODULE	FIRMWARE	DATA	INTERFACE	LOG	STREAMINGS
Package file for EO-VM70 C:\Users\EOVE\Documents\Se	ftware EO70\eo70-app-v2.0.0-C070	000401-P150000400-5.eopkg				
Package file for EO-VM150						

NOTE: The package files include the ventilator software (CPU) and power software (PIC

- To update CPU and PIC, click on "Update firmwares"



- Connect the module to the computer by usb

- Connect the AC power to the ventilation module

i eo-bolkit	CONNEC	π Ψ	\$	E (
Updating firmwares				
Firmware update 1. Connect an USB cable from the computer to the module 2. Connect AC external power supply to the module OK CANCEL				
EOVE and	Belance D	developed of	Harle H	la Para bara
		mas diges w	an of a	Caller Caller

- Switch off the device then click on OK

i w-twikit	CONNECT	ψ	鐐	
Updating firmwares				
Firmware update CPU will be flashed with version: C070000401 1. Switch off the module OK CANCEL				
EOVE and definition	8.1 🚺de	weloped wi	th v by th	e Eove team

Checking

Once the update performed:

- Insert the EOVE-70 module into the EO-Display housing unit
- Go to Information tab of Maintenance menu or go to Preferences menu to check that the software versions are updated and displayed properly.

Mode: IPPB	🔒 🛿 AC 2020/12/17 - 15:56
← Preferences	
2020/12/17	*
15:56	\$
Information	
Operating system version	
User interface version	
Module serial number	
CPU version	
POWER version	
GAUGE version	5
	≡ 🛞 ♠

14.3 OP2: Control of keyboard LEDs and buttons

- Module switched off, the keyboard must appear like the image below



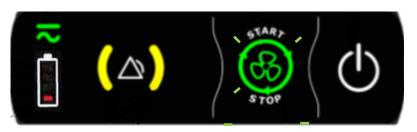
Keyboard turned off

14.3.1 OP2-1: Turn on and configurate external DC power on 28V - 4A.

- Disconnect the internal battery
- Connect DC power to the module and check that all the keyboard LEDs switch on but not AC indicator, blink once when the module starts



- Then control that AC indicator switch on and battery charge indicator increments
- Check that after 20 seconds, the battery red LED and the alarm indicator are switched on and the ventilation LED blinks



14.3.2 OP2-2: Press the ventilation button on the keyboard

- This LED stops blinking and stays on and the ventilation starts 🚱
- Press the button 🚱 en a beep sounds, and ventilation stops
- Connect the battery
- 14.4 OP3: Control of electrical interfaces and communication with docking station

14.4.1 OP3-1: Operation on 12VDC power

- Switch on external DC power and set it on 12V 7A.
- Connect the external DC power to the docking station then insert the module inside
- Control module operation by checking the following LEDs



- Start the ventilation to control module operation on this power source
- Stop the ventilation

14.4.2 OP3-2 : Operation on AC power

- Connect AC power on the docking station

NOTE: We recommend using the AC charger provided with the EOVE-70 SMD to control it at the same time.

- Control module operation by checking the following LEDs



- Start the ventilation to control module operation on this power source
- Stop the ventilation

14.4.3 OP3-3 : Operation on internal battery

- Disconnect AC power source from the docking station
- Control module operation by checking the following LEDs



- Start the ventilation to control module operation on this power source
- Stop the ventilation
- Connect AC power on docking station and check that the module switches properly on AC mode
- Pair the docking station with the module and check the connectivity
- Set date and time
- Remove the module from the docking station

OP4: Performance controls

14.4.4 OP4-1: Set point ± 60 mbar in automatic mode

- Set the following configuration
 - Mode: INEX
 - Operating Mode: Auto
 - Insp. Pressure: + 60 mbar
 - Ramp: 2
 - Insp. Time: 3 s
 - Trigger: Off
 - Pause: 1 s
 - PEEP: 4 mbar
 - Exhal. Pressure: 60 mbar
 - Exhal. Time: 2 s
 - Oscillation On: Off
 - Cycles Nb. : 5

Mode: INEX (Auto)		■ 76% ¥	2018/08/10 - 17:51
← Mode: INEX ▼	Preset	: None	Save Load
Operating Mode :	Insp. Pressure :	катр :	Insp. I ime :
Auto	+60 mbar	2	3 s
Trigger :	Pause :	PEEP :	Exhal. Pressure
Off	1 s	4 mbar	-60 mbar
Exhal. Time :	Oscillations :	Cycles Nb.	
2 s	Off	5	
	= ℃	シ 🔒	

- Connect a short single limb (60cm) circuit between EOVE-70 module and the flow analyzer
- Connect the back of the flow analyzer to an adult test lung
- Connect a SpO2 sensor to the dedicated connector of the module and activate the function on the interface
- Set the following configuration on the flow analyzer:
 - o Go in Menu then Trigger
 - o In **Details**, set the following parameters

Trigger	
Resp. Mode:	ACOULS
Measured throug	gh High Flow channel
Back Deta	ils Change Numerical





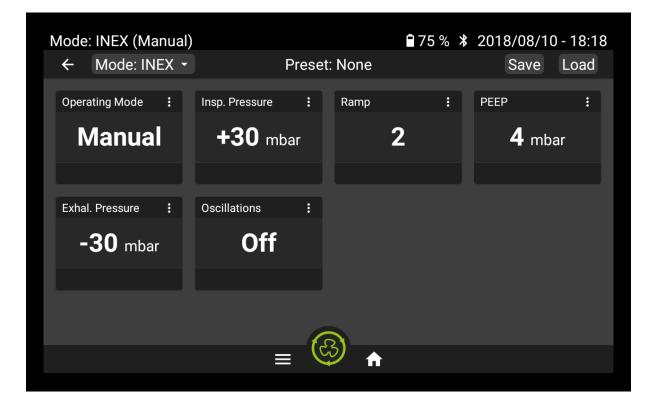
- Start the ventilation from the interface
- From the third cycle of operating, read the following measures on the interface
 - Peak Flow
 - Tidal Volume
 - o **SpO2**
- Read the following measures on the flow analyzer
 - o Ppeak
 - o Pplateau
 - PF Exp (Peak Flow Exp)
 - o Vti

14.4.5 OP4-2: Inspiratory trigger control

- Be sure that during previous operations there wasn't any inspiratory auto-trigger
- Stop the ventilation

14.4.6 OP4-3: Set point ± 60 mbar in manual mode

- Set the following configuration
 - Mode: INEX
 - Operating Mode: Manual
 - Insp. Pressure: + 30 mbar
 - Ramp: 2
 - PEEP: 4 mbar
 - Exhal. Pressure: 30 mbar
 - Oscillation On: Off



- Connect the remote-control pedal or equivalent at the back of the module on the dedicated connector



- Disconnect the SpO2 sensor



- Start ventilation from the interface
- Switch the manual remote control from a side to another and check the correct operation of the module respiratory phases

14.5 OP4-4: Turbine performance controls

- Disconnect the patient circuit connected at the rear of the flow analyzer
- Switch the manual remote control to a side
- Read the flow measure on PF300
- Stop the ventilation and switch the treatment into automatic mode

14.6 OP5: Battery charge control

- OP5-1: Connect the module to AC power and check that the charge is in progress on the battery indicator (keyboard
- Control that the charge is complete before 8 hours.

15 Test of the pneumatic block

15.1 Pneumatic sealing control

- Plug the pump connector and the tube 2



- Press the red button of the solenoid valve A with a screwdriver or something similar and apply a 100mbar pressure from a pressure gauge on the tube 1



- Check that the pressure doesn't drop down
- Perform the same test on the solenoid valve B

15.2 Solenoid valves electrical operation

- ternal power support
- Connect an external power source (29Vdc/0,5A) on each connector of the solenoid valves

- Release the power and check that the solenoid valves are closed, and their LED switched on
- Check the solenoid valve controlled is closed by applying a 100mbar pressure like during the previous test.

16 Test of rear valves block

16.1 Pneumatic sealing of the rear valves block subassembly

• Apply a pressure of 100mbar on each valve cap thanks to a pressure gauge



- Check that the pressure remains steady during at least 5 seconds
- Increase the pressure by pressing on the gauge 4 or 5 times and verify that the cap stays on position

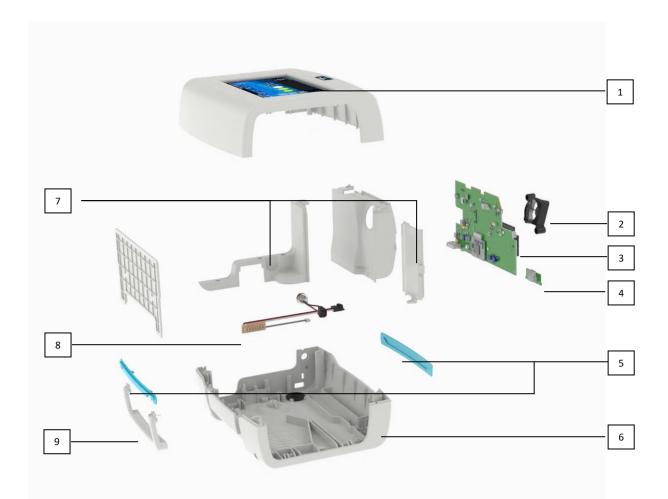
17 EO-Display housing unit: replacement procedures

17.1 Opening and closing the EO-Display housing unit

Maintenance operations on the housing unit require opening the device. Be sure to strictly observe the opening and closing instructions of the various components by referring to the following instructions.

WARNING: Any operation that requires opening the docking station must be performed by a qualified technician.

17.1.1 Docking station structure



EO-Display Housing unit architecture

1.	Upper shell & display screen	6. Lower shell
2.	Cooling fan	7. Covers
3.	EO-Display CPU board	8. Connection board & DC plug cable
4.	USB board	9. Handle
5.	Insert	

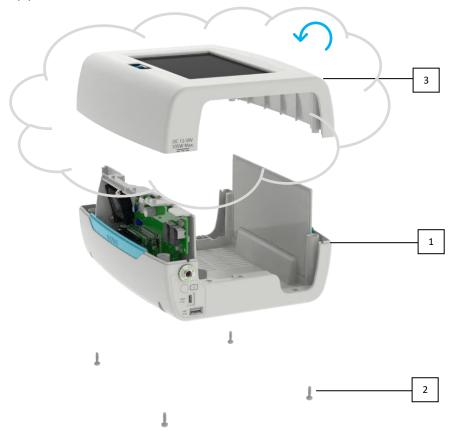
17.1.2 EO-Display Opening

Be sure to strictly observe the opening and closing recommendations of the various components by referring to the following instructions.

WARNING: Any operation that requires opening the EO-Display should be performed by a qualified technician.

- Remove the module from the EO-Display housing unit.
- Turn over the unit (lower shell (1) to the top) and remove the four screws (2).
- Turn the device over again (upper shell above) by holding the two shells in position.

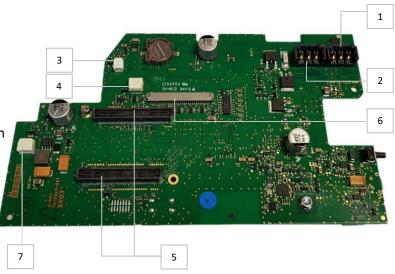
Flip the upper shell (3) on the left side.



WARNING: Pay attention to the cables connecting the upper shell to the CPU board (left side).

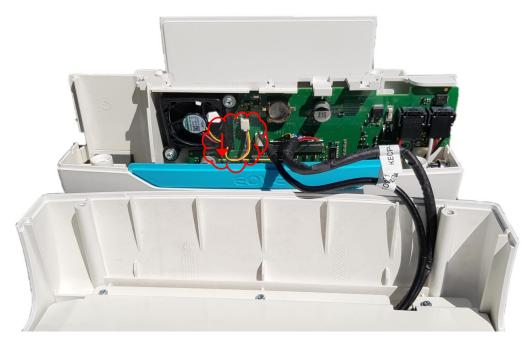
17.1.3 EO-Display CPU Board electrical connections

- 1. Pistons board connection
- 2. DC power plug connection
- 3. Cooling fan connection
- 4. Touch screen cable connection
- 5. SOM connection
- 6. LVDS cable connection
- 7. USB board connection

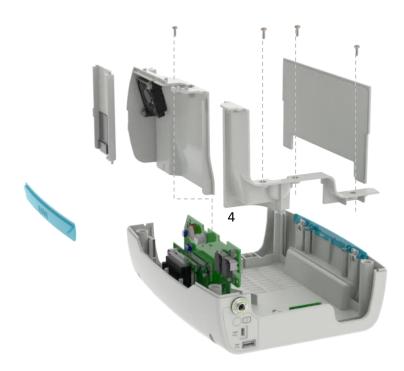


17.1.4 Electronic boards removal

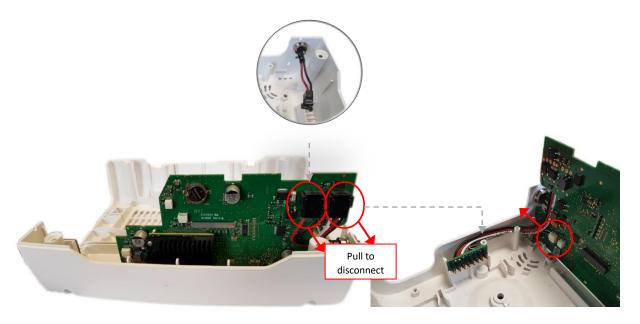
- Disconnect the cable of the cooling fan from the CPU board
- Then, disconnect the touch screen cable and the LVDS cable



- Remove the three screws of the cover (4).
- Remove the four covers.



- Disconnect the 2 cables of the connection (pistons) board from the CPU board
- Disconnect the cable of the DC power plug from the CPU board



- Remove the connection (pistons) board
- Unscrew the CPU board then gently remove it from its slot



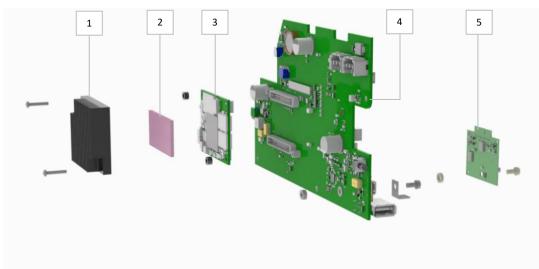
WARNING: Be careful, the USB board is still fitted in its slot and connected to the CPU board

- Disconnect the USB board from the CPU board



- Remove the CPU board and the USB board

17.1.1 EO-Display CPU board assembly



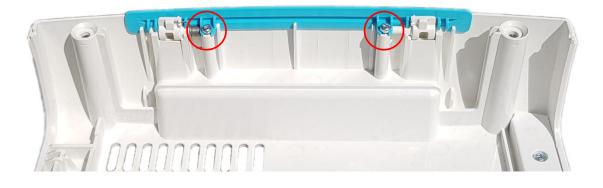
Composition of the EO-Display CPU board

0

1. Heatspreader	1. CPU board
2. Thermal pad	2. Wi-Fi board (OPTIONNAL)
3. SOM (System On Module)	

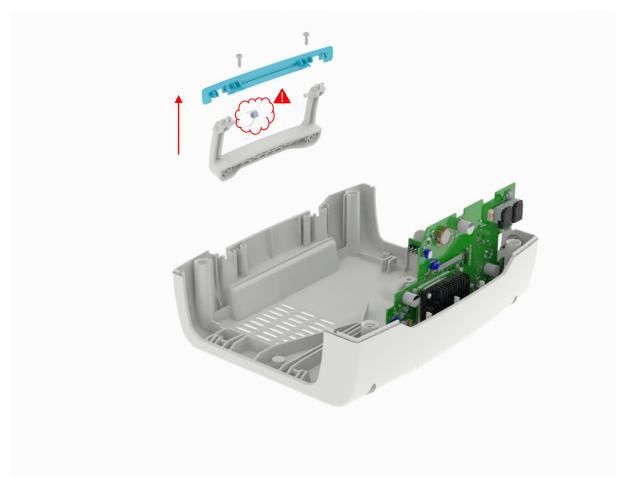
17.1.2 EO-Display handle removal

- Unscrew the green insert from the lower shell



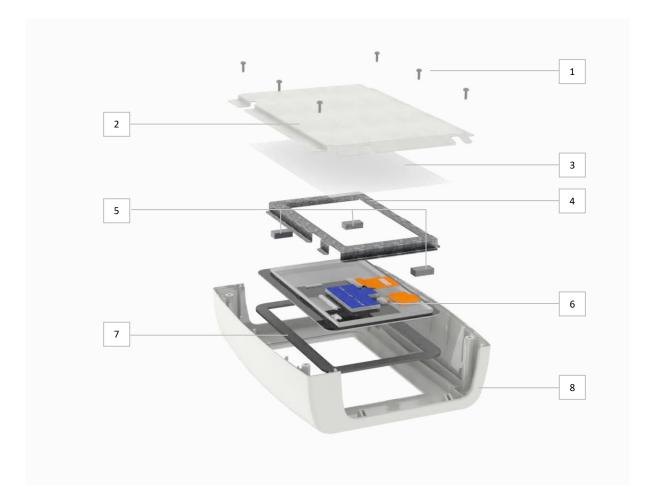
Lift the insert then the handle

_



WARNING: Pay attention to not lose the spring when you remove the handle

17.1.3 EO-Display screen connections

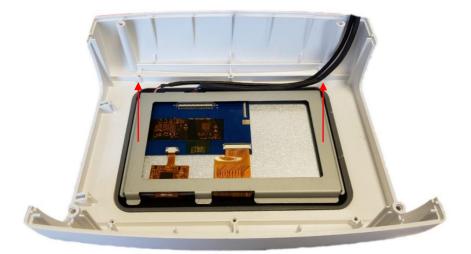


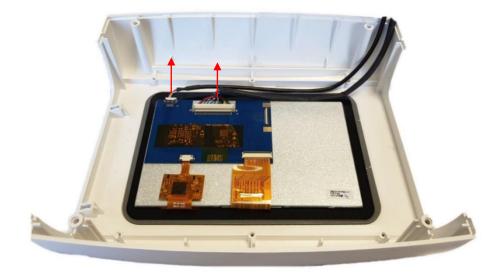
EO-Display upper shell architecture

1. M3x8 screws	2. Screen metal protection
3. ESD sheet protection	4. Frame
5. Frame foams	6. Display screen
7. Screen foam	8. Upper shell

- Remove the 6 screws from the screen metal protection

- Remove the screen frame





- Disconnect the touch screen cable and the LVDS cable

17.1.4 Cooling fan removal

- Remove the 2 screws with their washer

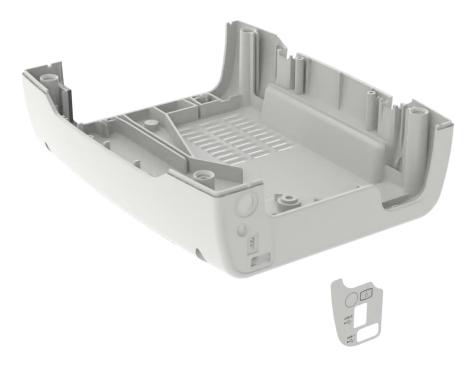


- Remove the cooling fan suspension



17.1.5 EO-Display keyboard replacement

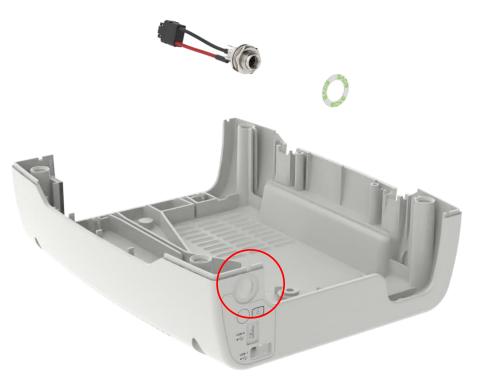
- Unstick the keyboard from the lower shell
- Clean the keyboard slot with an appropriate surface cleaning solution
- Stick the new keyboard on the dedicated slot



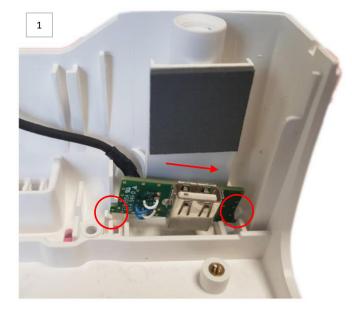
17.2 EO-Display assembly

17.2.1 EO-Display peripheral connections

- Screw the DC power plug on the dedicated slot of the lower shell and respect a tightening torque of 1N.m



- Put the USB board in place, in two steps

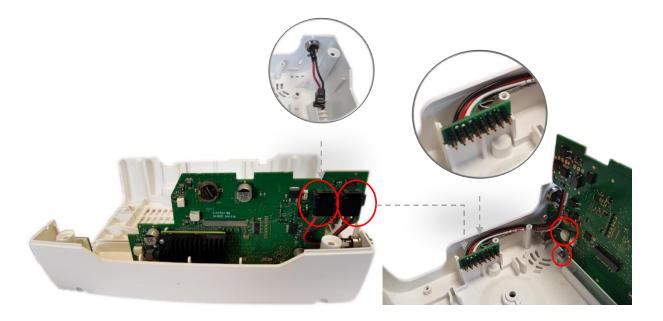




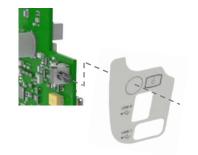
- Connect the USB board to the CPU board



- Position the CPU board an connect the pistons board and the DC plug cable on it
- Check that the CPU board is properly on position and screw it into the lower shell



WARNING: You must hold the CPU board when you screw it to keep a good contact between the On/Off button and the Keyboard.



17.2.2 EO-Display handle assembly

- Position the spring on the handle and position it onto the lower shell
- Screw the insert and verify the handle move properly





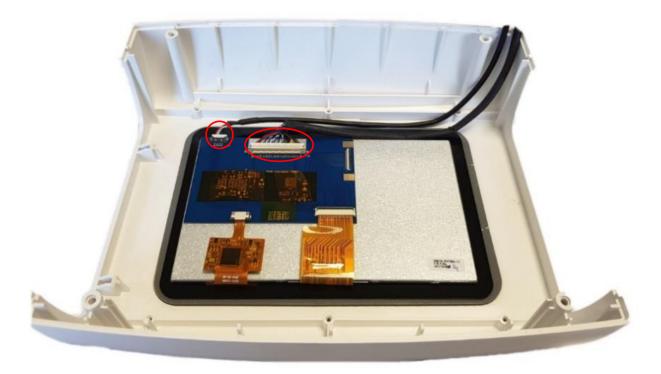


- Position the pistons board cover and screw it (x3)



17.2.3 EO-Display screen assembly

- Connect the touch screen cable and LVDS cable to the display screen



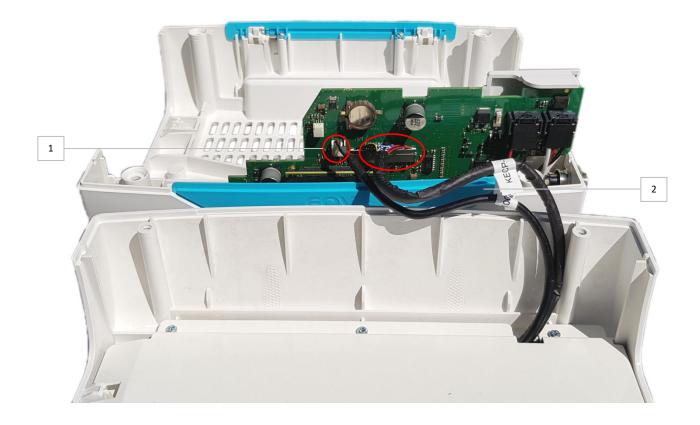
- Position the screen frame



- Screw the screen metal protection (x6)



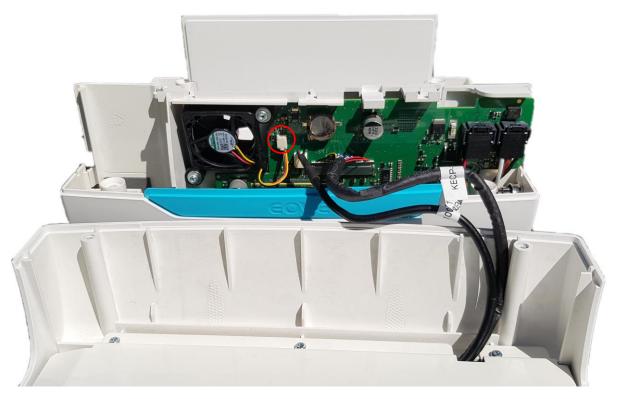
- Connect the touch screen cable and the LVDS cable (1) to the CPU board
- Position the insert (2) and the handle cover on the lower shell



17.2.4 EO-Display fan assembly

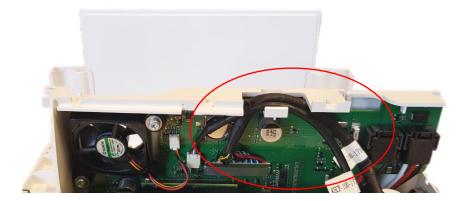
- Put the cooling fan and its suspension in place





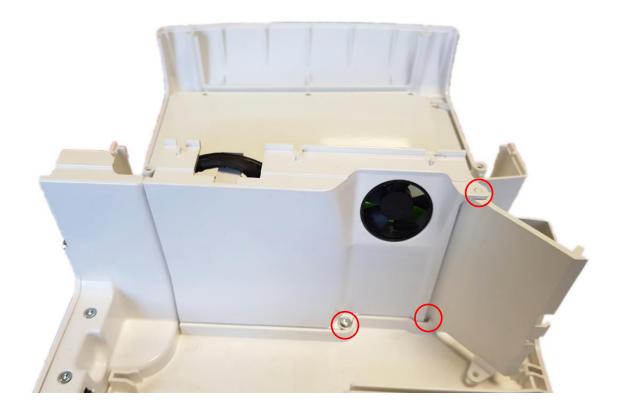
- Position the fan cover and connect the cooling fan to the CPU board

NOTE: the touch screen cable and the LVDS cable must be held by the fan cover as done on the picture below.



17.2.5 EO-Display closing

- Position the USB board flap then screw the fan cover



NOTE: We advise keeping the USB board flap opened and close it only when the EO-Display is completely assembled.

- Spin the upper sheel and lift it above the lower shell

WARNING: Be careful to not catch cables between the two shells when you close the EO-Display.



- Flip the EO-Display and screw the lower shell to the upper shell

18 EO-Display housing unit: Performance controls

18.1 OP6-1: Operation on power source and charge control

- Turn off the EO-Display housing unit
- Connect the housing unit to the AC power source
- Start the housing unit by pressing the On/Off button at the rear
- Check that the EO-Display boots properly

18.2 OP6-2: Software versions

- Go in Preferences menu and check OS and Interface versions
- Update them if necessary

Mode: IPPB	🔒 🛿 AC 2020/12/17 - 15:56
← Preferences	
2020/12/17	~
15:56	\$
Information	
Operating system version	eove-eodisplay-1.5.0
User interface version	2.3.0 (eodisplay)
Module serial number	E0070000DFV
CPU version	C070000604
POWER version	P150000400
GAUGE version	5

- Switch off the EO-Display housing unit

18.3 OP6-3: Test of the communication with the module

- Start a charged module and place it in the housing unit
- Once the display screen boot complete, verify that the communication with the EO-70 SMD module is established and information are displayed



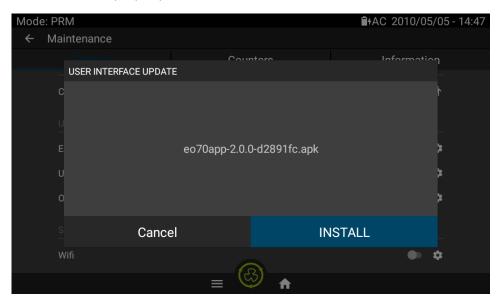
18.4 OP6-4: Operation on internal battery of EO-70 SMD module

- Disconnect AC power source
- AC power indicator must disappear **CAC** in the top right corner of the screen and it must display the remaining charge of the EO-70 SMD module



18.5 OP6-5: Check USB ports

- Connect a USB stick embedded with the interface software version, onto the dedicated port of the EO-Display keyboard
- Go to the maintenance menu / General tab and select EO70 user interface to check that the USB stick is properly detected



18.6 OP6-6: Wi-Fi feature test (optional)

- If the Wi-Fi option is activated on the EO-Display, go to the Maintenance menu and verify that the local Wi-Fi signal is detected

18.7 OP6-7: Interface setting

Check date, time and language

Mode: INEX (Auto) ← Preferences		10	00 % 훅 2020/05/06 - 15:22
Settings as list			
Brightness	_		
Transitions beep			
Date and time	10.10	9 21 15 3	
2020/05/06	16:19	²⁰ 8 19 18 17 4	\$
16:20			\$
Information		CANCEL OK	
Operating system ver			
Lloor interface version			

18.8 OP6-8: EO-Display switch off from EO-70 SMD module

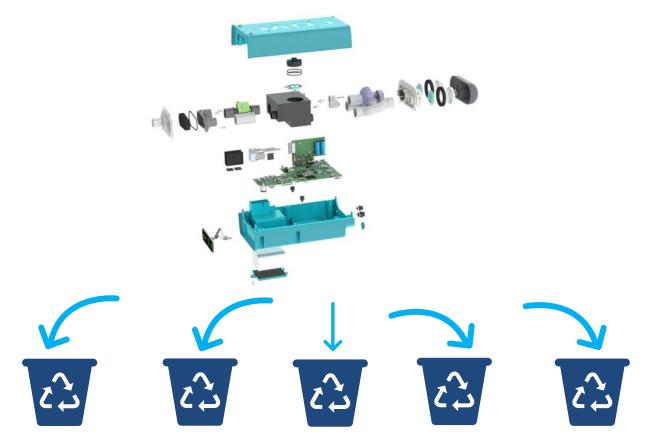
- Press around 10s the On/Off button at the rear of the EO-Display housing unit
- Verify that the EO-Display turns off

18.9 OP6-9: Visual inspection

Proceed to a visual inspection of the shells, covers, labels

19 EO-70SMD disposal

The disposal of the EO-70SMD must be done by dismantling the device according to EOVE procedure (refer to \$11 EO-70 SMD module: Replacement procedures & \$14 Housing unit: replacement procedures) in order to split the parts and send them toward the appropriate recycling channel.



Lithium Ion Batteries	Electronic boards	Electronic waste	Plastic / shells	Foams/tubes/sealing rings
				0
	Q			

19.1 Use of dangerous substance

Lithium Ion battery is considered as dangerous good. Manufacturing, transport, storage and disposal of Lithium Ion batteries are strictly followed by safety process.

The disposal of defective batteries should be done in compliance with the laws in effect in your country. Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

Lithium Ion technology of the internal battery requires a secure design. That is why, only batteries developed under EOVE control and provided by EOVE are suitable and allowed for EO-70SMD operation.

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD ventilator out of service and reduce the use of dangerous substances, recycling procedures must be strictly followed in compliance with laws in effect in the distributed country.

19.2 Emissions in the air

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service and reduce the emissions in the air, recycling procedures must be strictly followed in compliance with laws in effect in the distributed country. Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

Device must be dismantled and battery, turbine & motor, solenoid valves, electronic parts, display screen and other plastic parts must follow appropriate collection and recycling process in compliance with country regulations.

19.3 Rejects in surface water and groundwater table

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service and reduce the rejects in surface water and groundwater table, recycling procedures must be strictly followed in compliance with laws in effect in the distributed country. Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

Device must be dismantled and battery, turbine & motor, solenoid valves, electronic parts, display screen and other plastic parts must follow appropriate collection and recycling process in compliance with country regulations.

19.4 Waste, especially dangerous substance

Waste of the EO-70SMD which contain dangerous substance only concern the internal battery and the tablet battery (Lithium Ion technology) with a periodical replacement every 2 years.

The disposal of defective batteries should be done in compliance with the laws in effect in your country. Lithium Ion Battery, when defective, might present explosion or combustion risks. Used

batteries must be stored in closed ratified boxes with appropriate protection (like vermiculite) against impacts and overheating propagation.

Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service and reduce the final wastes of dangerous substances (after incineration for exemple), recycling procedures must be strictly followed in compliance with laws in effect in the distributed country.

19.5 Use of raw material, energy

EOVE is not responsible for the proper recycling of your EO-70SMD ventilators park. To put the EO-70SMD out of service and reduce the use of raw material, energy (during incineration, transformation), recycling procedures must be strictly followed in compliance with laws in effect in the distributed country.

19.6 Noise, vibrations, smell, dust, electromagnetic field

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service and reduce the noise, vibrations, smell, dust, electromagnetic field (during incineration, transformation), recycling procedures must be strictly followed in compliance with laws in effect in the distributed country.

19.7 Transportation

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service and reduce the transportation of wastes, recycling procedures must be strictly followed in compliance with laws in effect in the distributed country.

Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

19.8 Risks caused by environmental accidents

Environmental accidents such as earthquakes, floods, hurricanes, tsunamis, and safety risks they can cause onto the wastes and treatment center of the wastes (incineration, transformation), can have huge environmental impact.

EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service and reduce the risks caused by environmental accidents, recycling procedures of wastes must be strictly followed in compliance with laws in effect in the distributed country.

19.9 Biosphere contamination

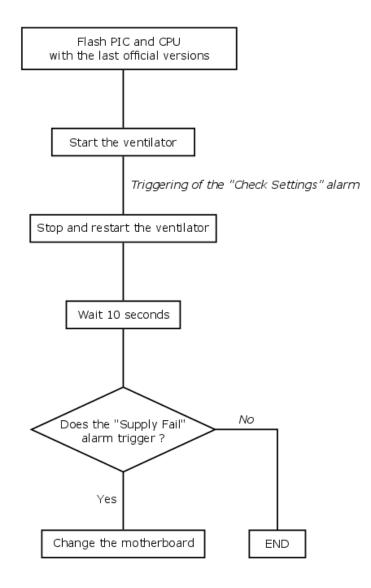
EOVE is not responsible for the proper recycling of your EO-70SMD park. To put the EO-70SMD out of service, and reduce the biosphere contamination, recycling procedures must be strictly followed in compliance with laws in effect in the distributed country. Collection toward a recycling center, must be done by accredited channels able to provide certificate and traceability.

Device must be dismantled and battery, turbine & motor, solenoid valves, electronic parts, display screen and other plastic parts must follow appropriate collection and recycling process in compliance with country regulations.

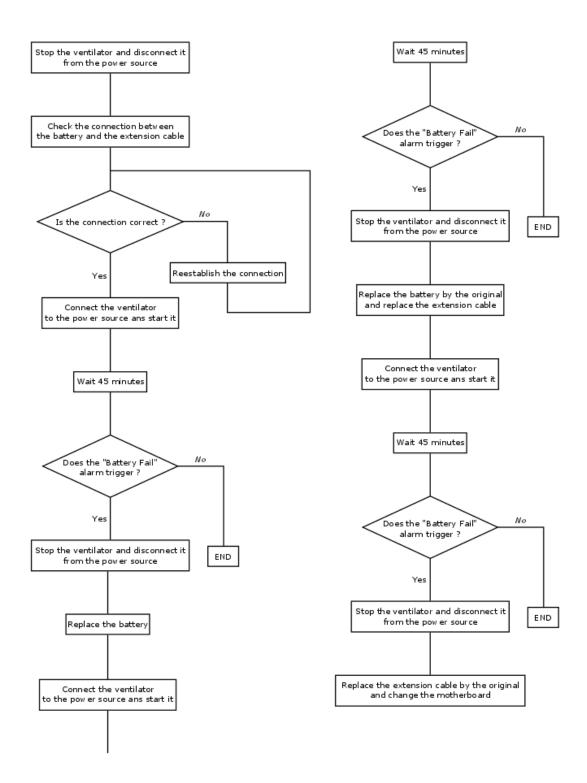
APPENDIX

20 APPENDIX 1: Troubleshooting trees

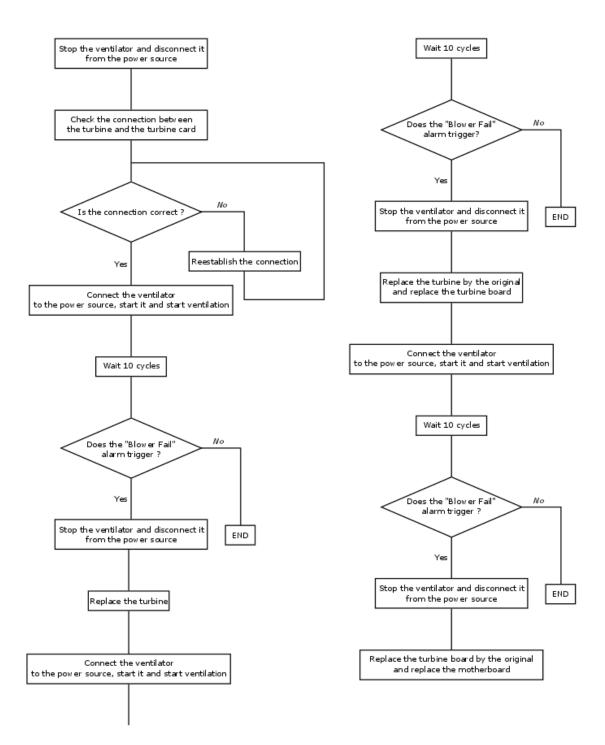
20.1 Supply Fail



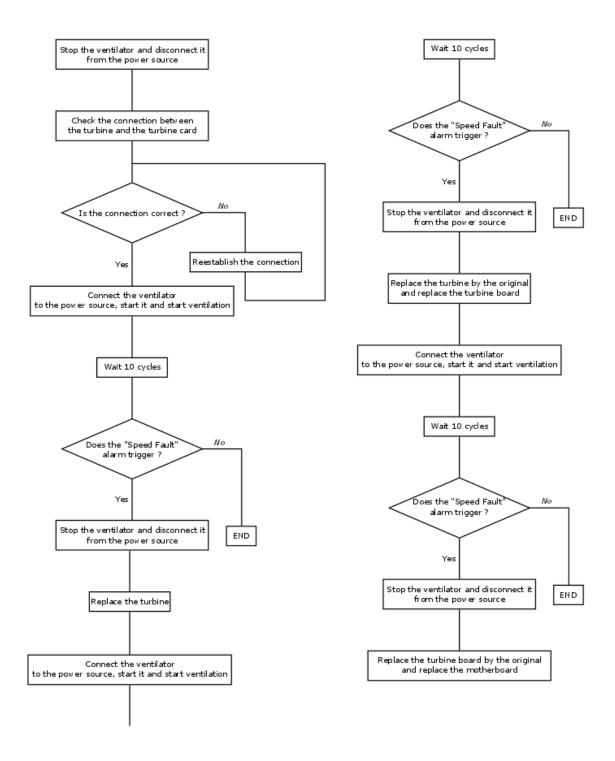
20.2 Battery Fail



20.3 Turbine Fail

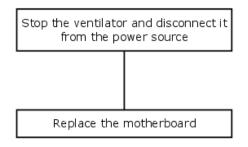


20.4 Speed Fault

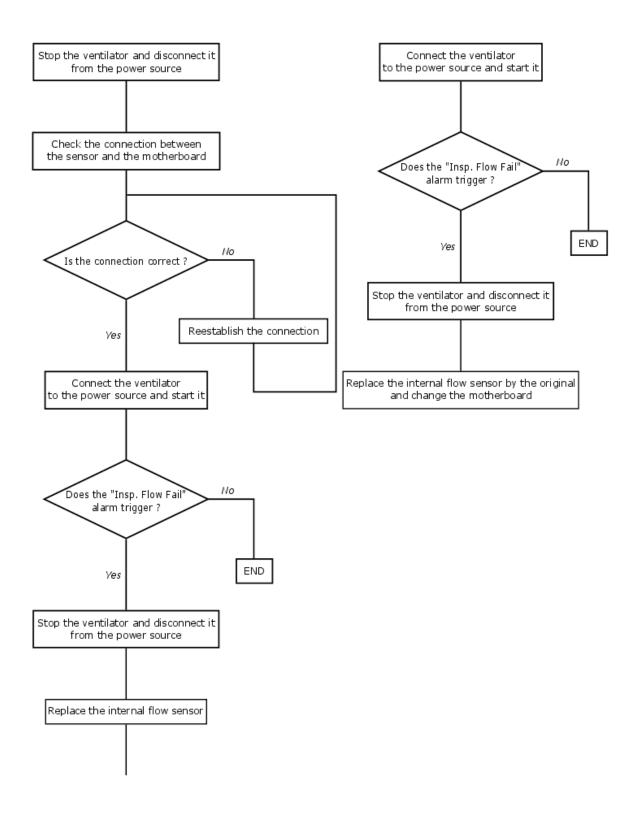


172

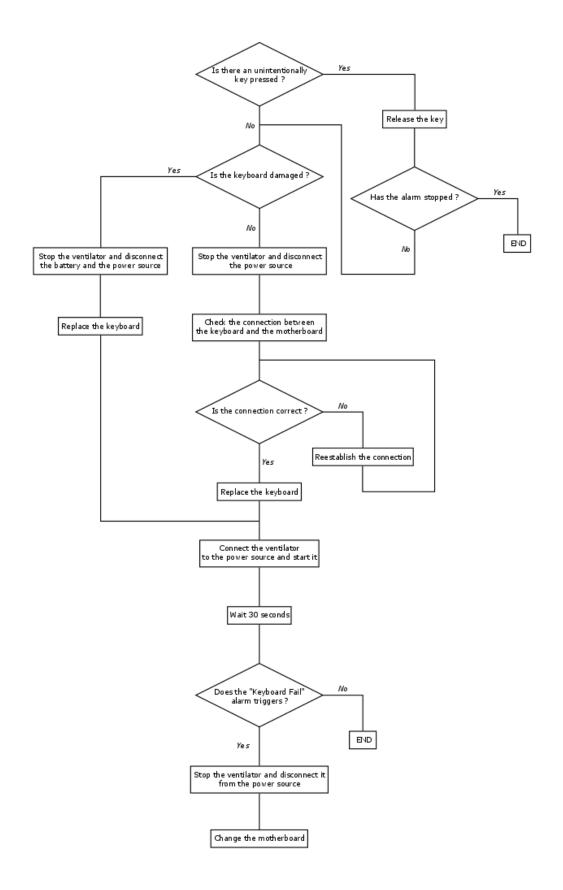
20.5 Sensors failure / CPU Fail / Memory Fail / Device information lost



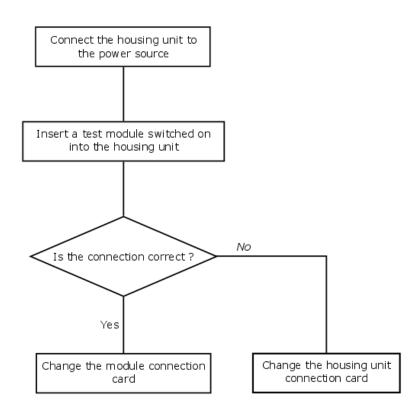
20.6 Insp. Flow Fail



20.7 Keyboard Fail



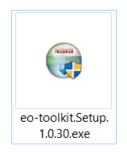
20.8 No communication between the unit and the ventilator



21 APPENDIX 2: Software installation

21.1 EO TOOLKIT

- Download EO-Toolkit .exe file from the maintenance portal of EOVE website (http://eove.fr/cms/en/produits-et-support/maintenance/eo-70-cough-assist)
- Install EO-Toolkit



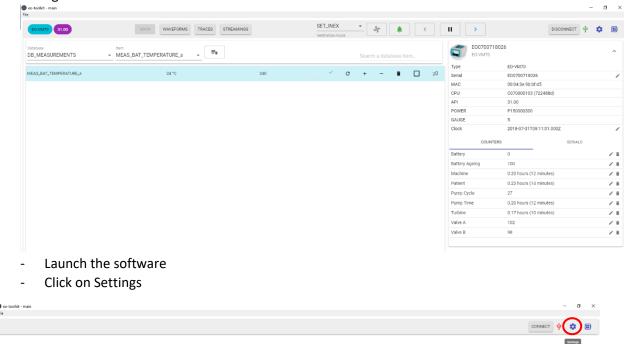
NOTE: FTDI drivers must be updated/installed from Windows Update or the following links:

Windows 32 bits

https://www.ftdichip.com/Drivers/CDM/CDM%20v2.12.28%20WHQL%20Certified.zip

Windows 64 bits

https://www.ftdichip.com/Drivers/CDM/CDM%20v2.12.28%20WHQL%20Certified.zip



- Configurate EO-TOOLKIT

- Connect an EOVE-70 module by usb to the computer
- Choose two consecutive usb ports lower than 10

- Select the API file required. It must be accordance with software version which might be updated. By default, enable Auto Select API descriptor

Settings					
CONNECTION	CHECK MODULE	FIRMWARE	DATA	LOG	STREAMING
List USB Ports	SCAN				
ain USB port (CPU) Second					
Auto Select API de	peorinter file				
Auto Select AFT de	scriptor nie				
				ОК	EXPORT

- Click on OK

WARNING: Make sure to use two consecutive usb ports lower than 10.

• If you run the automatic performance controls via EO-Toolkit, complete the check module settings as bellow

1		2		3	
Settings					
CONNECTION	CHECK MODULE	FIRMWARE	DATA	LOG	STREAMING
Tester name	Tester e				
Mister Blue	🗹 s	av@eove.fr			
Check type category Customer					
Instruction reference E070 Technical m	anual rev DB				
Test reports directory					
	Blue \Documents\New fo	lder			
Flow analyzer USB port					
Enable sound					
4	5	6			

1- Technician

_

- 3- Documentation associated
- 5- Choice of Flow Analyzer USB port (must be connected first)
- 2- User e-mail address
- 4- On/Off test sound
- 6- Destination folder to save Process Value tests

- Click on update firmwares

CONNECTION	CHECK MODULE	FIRMWARE	DATA	LOG STRE
ckage file for EO-VM70				
\\WALL-E\eove-sh	ared\preproduction_bin	aries\eo-display_asset	s\eo070\default\eo70app-2	2.0.0-C070000401-P15000
ckage file for EO-VM150				
D:\eo150app-2.1.1	-C150000606-P150000	400.eopkg		
kit - main				-
				CONNECT 🜵
- Select path	file to executable	PIC and CPU soft	ware	
beleet pati				
Update Fi	mwares			
opuatern	mwares			
D:\eo70\C0	70000103-api3	1-722488d0.H8	36	UPDATE CPU
CPU firmware				
CFU IIIIIWale				
			E0000200 hav	
D:\eo70\eo	070\default\mo	dule\power\P	1 30000300.nex	UPDATE POWER

\sim		~	0	-
1 3	. (5	⊢.
	-	0	0	_

22 APPENDIX 3: Inspection sheet

New Medical Inspirațion	INSPECTION SHEET EOVE-070	SAV100- 12 REV D 06/05/20

OP6: EO-DISPLAY TEST	Result	Comments
OP6-1: Operation & charging with external power source		
OP6-2: Software versions		
OP6-3: Communication with module		
OP6-4: Operation on internal battery of ventilation module		
OP6-5: USB ports verification		
OP6-6: Wi-Fi feature (Optionnal)		
OP6-7: Setting of clock / date / language		
OP6-8: Switch off from ventilation module		
OP6-9: Labels: power source, serial number		

	Charger module S/N:	
EQUIPMENTS External battery EO-BAT9 S/N:		
COMMENTS		
	DATE PLACE	SIGNATURE

APPENDIX 4: Spare parts list

Spare Parts List EO-70SMD									Rev \ 10/9/202			
PRODUCT DESCRIPTION	Note: To order a spa EOVE P/N	ALMS P/N	EOVE PRICE	reference in EOVE	Photo UST OF COMPONENTS COMMENTS PRODUCT I							
Tablet Battery Kit E01X0-03	SP-TABBAT-003	KY732636	153.00 ¢					Z380M Tablet battery + support	From manufactured device S/N > EO1X002180115	1	~	
Docking Lower Shell EO1X0	SP-DOCKLOSHEL-001	KY732645	51.00 ¢					DCK Lower Shell + 4 DCK Feet + SN Label	Provide S/N to edit the label	📚 🍫	~	
Insulating Washer	SP-INWASH-001	KY732628	24.48 €	O x20				20 pieces		*	~	
DCK Power Connector Spinning Prevention	SP-SPINPREV-001	In progress	48.96 €	00000000 x8				8 pieces		*	~	
Inspiratory Flow Sensor	SP-INSFLOWSENS-001	KY732637	183.60 €	-						1	~	
Internal Battery Pack Li-Ion	SP-INTBATT-002	KY732930	255.00 €	9						*	~	
Display data cable EO1X0	SP-DISPDATACBL-002	KY732623	30.60 €)					From manufactured device S/N > E01X001170515	1	~	
FiO2/SpO2 Cable + Connector	SP-FIO2SPO2CBL-002	KY732626	40.80 €	· · · · · · · · · · · · · · · · · · ·					From manufactured device S/N > E01500518022B	1	~	
Remote Alarm Cable + Connector	SP-REMALCBL-002	KY732647	51.00 €						From manufactured device S/N > E015005180228	1	~	
Turbine EO-70	SP-TURB70-001	KY732673	459.00 €	\$						N	~	
Solenoid valve Clippard EO70	SP-SOLVALVE-002	KY732676	76.50 €							*	~	
Solenoid valve Camozzi EO70	SP-SOLVALVE-003	KY732675	86.70 €	Ŵ						*	~	
Pneumatic Block EO70	SP-PNEUBLOCK-002	KY732657	387.60 €							*	~	
Valve Support E070	SP-VALSUP-001	KY732672	61.20 €		*** #						~	
Pneumatic Block Cover EO70	SP-PNEUCOV-001	KY732658	20.40 €	<u>.</u>							 	
Exhalation/Inhalation valve E070	SP-EXHVALVE-002	KY732674	30.60 €	1 .20					Do not use ref SP-EXHVALVE- 001 for EO70 purpose	N	~	
Blower Control PCB E070	SP-BLOWRPCB-002	KY732664	183.60 €							A	~	

SP-CPU70-001	KY732661	1,173.00 ¢							*	~
SP-MODULKEYBD-002	KY732663	91.80 €	(10) (B) (B)						*	~
SP-PUMP-001	KY732669	122.40 €	S.						*	
SP-CIRPORT-001	KY732670	20.40 €	1990						*	~
SP-PMKIT-001	KY732668	40.80 €	0			- Co			*	~
SP-AIRFILT-001	In progress	51.00 €	0						*	~
SP-LOSHEL-002	KY732665	249.90 €		-		-	Lower Shell + Remote Alarm & SpO2 Connectors + Foams + 2 Spring Buttons + Keyboard + Battery Flap + SN Label		*	~
SP-UPSHEL-002	KY732667	76.50 €	1				Upper Shell + Foams + 2 Spring Buttons		*	~
SP-VALCOV-001	KY732660	15.30 €							*	~
SP-DOCKPWR-004	KY732662	153.00 €	0 % V							~
SP-DOCKDISPL-002	KY732671	464.10 €							*	
SP-DOCKCOV-002	KY732659	20.40 €		5.4	-	5.4	3 DCK Covers + 2 DCK Inserts		A	~
SP-DOCKUPSHEL-002	KY732666	45.90 €					DCK Upper Shell + EO70 Label + Adhesive to past the tablet		*	~
SP-LVDSCBL-001	In progress	20.40 €	P,						Ö	\sim
SP-TOUCHCBL-001	In progress	15.30 €	\subseteq						🎓 爹	\sim
SP-PISTBOARD-001	In progress	122.40 €	F						۱ الله الله	\sim
SP-DCPLUG-001	In progress	40.80 €							📚 🍏	\sim
SP-UPDISPLAY-002	In progress	234.60 €	-				Display screen + Upper shell			~
SP-TIMBAT-001	In progress	20.40 €							🏷 爹	\sim
SP-CPUDISP-001	In progress	510.00 €	<u> </u>				CPU + SOM + HEATSPREADER		۵ می	\sim
	SP-MODULKEYBD-002 SP-FUMP-001 SP-CIRPORT-001 SP-CIRPORT-001 SP-AMRFILT-001 SP-LOSHEL-002 SP-UPSHEL-002 SP-DOCKPWR-004 SP-DOCKDISPL-002 SP-DOCKDUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-002 SP-DOCKLUSPL-001 SP-TOUCHCEL-001 SP-POCPLUG-001 SP-DCPLUG-001 SP-TIMBAT-002	SP-MODULKEYBD-002 KY732663 SP-YUMP-001 KY732669 SP-CIRPORT-001 KY732660 SP-CIRPORT-001 KY732668 SP-AIRFILT-001 In progress SP-LOSHEL-002 KY732667 SP-VALCOV-001 KY732667 SP-DOCKPWR-004 KY732667 SP-DOCKDISPL-002 KY732662 SP-DOCKDUSPL-002 KY732667 SP-DOCKDUSPL-002 KY732667 SP-DOCKDUSPL-002 KY732667 SP-DOCKDUSPL-002 KY732667 SP-DOCKDUSPL-002 KY732667 SP-DOCKLUSPL-002 KY732667 SP-DOCKLUSPL-002 KY732667 SP-DOCKLUSPL-002 In progress SP-DOCKLUSHEL-002 In progress SP-TOUCHCBL-001 In progress SP-POCPLUG-001 In progress SP-UPDISPLAY-002 In progress SP-TIMBAT-001 In progress	SP-MODULKEYBD-002 KY732663 91.80 € SP-PUMP-001 KY732663 122.40 € SP-CIRPORT-001 KY732663 20.40 € SP-CIRPORT-001 KY732663 40.80 € SP-AIRFILT-001 IN progress 51.00 € SP-AIRFILT-001 IN progress 249.90 € SP-LOSHEL-002 KY732667 76.50 € SP-VALCOV-001 KY732667 15.30 € SP-DOCKDYPR-004 KY732667 15.30 € SP-DOCKDISPL-002 KY732667 153.00 € SP-DOCKDISPL-002 KY732667 20.40 € SP-DOCKDISPL-002 IN progress 12.40 € SP-TOUCHCBL-001 In progress 234.60 € SP-UPDISPLAY-002 In progress 234.60 €	SP-MODULKEYBD-002 KY732663 91.80 c IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SP-MODULKEYBD-002 KY732663 91.80 c Immerie SP-PUMP-001 KY732669 122.40 c Immerie Immerie SP-PUMP-001 KY732669 122.40 c Immerie Immerie SP-PUMP-001 KY732669 122.40 c Immerie Immerie SP-PUMP-001 KY732669 120.40 c Immerie Immerie SP-PMKIT-001 Improgress S1.00 c Immerie Immerie SP-AIRFILT-001 Improgress S1.00 c Immerie Immerie SP-UPSHEL-002 KY732667 76.50 c Immerie Immerie SP-UPSHEL-002 KY732667 15.30 c Immerie Immerie SP-DOCKDVP010 KY732667 15.30 c Immerie Immerie SP-DOCKDUPSHE-002 KY732657 15.30 c Immerie Immerie SP-DOCKDUPSHE-002 KY732657 20.40 c Immerie Immerie SP-DOCKDUPSHE-002 KY732657 20.40 c Immerie Immerie SP-DOCKDUPSHE-002 KY732657 20.40 c<	SP-MODULKEYBD-002 KY732663 91.80 C Intermediate Intermediate SP-PUMP-001 KY732669 122.40 C Image: Comparing the strength s	SP-MODULEXTED-002 KY732663 91.80 c America America America America SP-PUMP-001 KY732663 122.40 c America Image: Comparison of Comparison	Image: Market in the second	Image: Section of the secti	P# MODULATION 000 KY732643 91.85 (Image: state stat

EO-Display SOM	SP-DISPSOM-001	in progress	306.00 ⊄					📚 🥎	\sim
EO-Display Fan Suspension	SP-FANSUSP-001	In progress	10.20 €	Д				📡 💸	\sim
EO-Display Cooling Fan	SP-COOLFAN-001	In progress	30.60 €	2				🍥 🏠	\sim
EO-Display Assembled Cooling Fan	SP-ASSFAN-001	In progress	40.80 €	<u>s</u>			Fan suspension + Colling Fan	📚 🥎	\sim
EO-Display USB board	SP-USBRD-001	In progress	66.30 €					📚 🥎	\sim
EO-Display inserts EO70	SP-DISPINSRT-002	in progress	5.10 €					*	~
EO-Display Covers	SP-DISPCOVRS-001	In progress	25.50 €		-	_		📚 📚	\sim
EO-Dîsplay Handle	SP-DISPHANDL-001	In progress	10.20 €					📚 🍫	\sim
EO-Display Screws Kit	SP-SCREWSKIT-001	In progress	10.20 €				Screws + Washers	📚 🍫	\sim
EO-Dîsplay Keyboard	SP-DISPKEYBRD-001	In progress	20.40 €	<u>a</u>				🗳 🍏	\sim

New Medical Insolration	Rev V 10/9/2021					
PRODUCT DESCRIPTION	EOVE P/N	ALMS P/N	EOVE PRICE	рното	LIST OF COMPONENTS	COMMENTS
EO1X0-VNT Testing cable PF300	SP-TESTCBL-001	In progress	102.00€	8	Cable RS232/microUSB for final control - PF300/ventilation module	
EO1X0-VNT Testing cable CITREX H4	SP-TESTCBL-002	In progress	153.00€	0	Cable R5232/microUSB for final control - Citrex H4/ventilation module	
FiO2 testing connector	SP-TESTFIO2-001	In progress	36.72 €	۲		
Reconditioning Tool for device AC Plug	SP-PLUGTOOL-001	In progress	91.80 €			
Remote alarm test cable	SP-REMCBL-001	In progress	81.60 €	0		
Battery life test circuit	SP-BATESTCIR-001	In progress	20.40 €			
Tablet pattern EO1X0-001	SP-TABPAT-001	In progress	204.00€	5	For tablet model ME176	Until Docking station S/N < EO1X001170515
Tablet pattern EO1X0-002	SP-TABPAT-002	In progress	204.00€	5	For tablet model Z370C	Docking station manufactured between E01X00117051S < S/N < E01X00218011s
Tablet pattern EO1X0-003	SP-TABPAT-003	In progress	204.00€	5	For tablet model Z380M	From docking station 5/N > EO1X002180115
Tablet repair tool EO1X0	SP-TABTOOL-001	In progress	30.60 €	/		Tool to open the tablet
EO70 Pneumatic bloc Tool	SP-PNEUTOOL-001	In progress	153.00€	-		
EO70 Sealing test plugs	SP-SEALPLUG-001	In progress	357.00€	X3		
Double limb circuit 22mm	SP-DBLCIRCT22-001	In progress	20.00 €			
Double limb circuit 15mm	SP-DBLCIRCT15-001	In progress	25.00 €			

EO70 short single limb circuit 22mm	SP-SGLCIRCT22-001	In progress	15.00 €	**	
OM70 Tool	SP-OM70-001	In progress	102.00€		

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24 Appendix 5: Components serial numbers



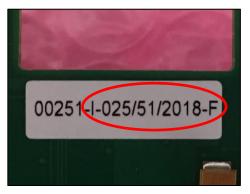
Pneumatic block



Solenoid valve



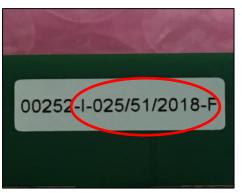
Inspiratory flow sensor



CPU board



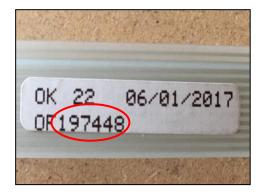
EOVE1 Battery S/N (ex: 17-351501)



Turbine board



EOVE3 Battery S/N (ex : VCA2027182)



Keyboard



Turbine



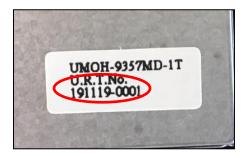
CPU board EO-Display



Wifi board EO-Display



USB board EO-Display



Screen S/N EO-Display