

## F-OEM A MODULAR PRESSURE & FLOW CONTROL PLATFORM FOR INDUSTRY

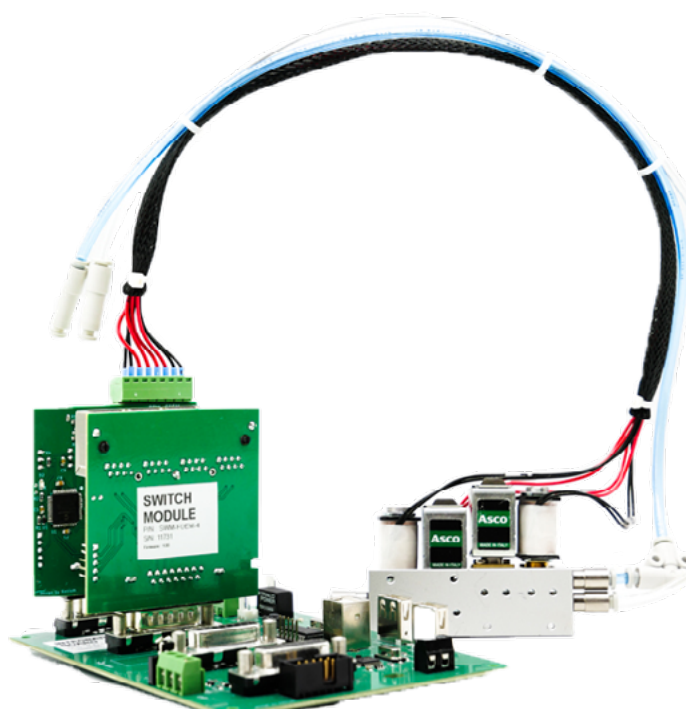
Our F-OEM offers our highest performance, efficiency, and widest pressure and flow rate ranges to support the most demanding industrial applications, including microfluidic and nanofluidic applications (microchannels, nanochannels, capillaries, lab on a chip...).

### Key features:

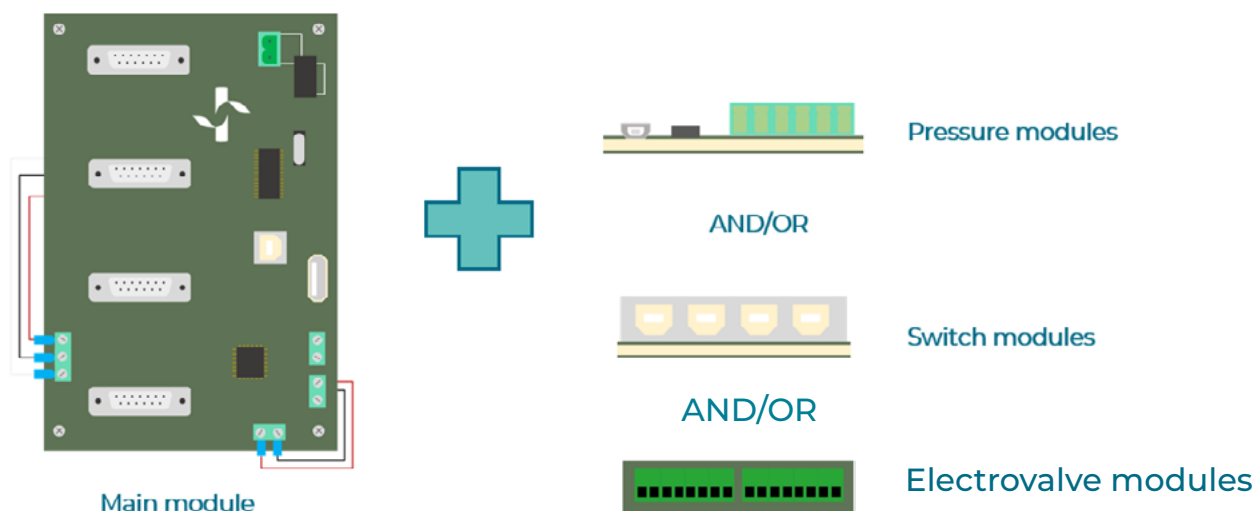
- Best performance: Excellent response time, pulseless and highly stable flow rate
- Flexible: Configurable with pressure and switch modules
- Compact: Standalone platform
- Contamination-free: not in contact with liquid

### Key applications

- Cell cytometry, sorting and encapsulation
- Drug testing
- Organ on a chip
- Droplet generation and study e.g. droplet digital PCR (dPCR)
- Micro-sampling systems for imaging machines
- Chemical Analysis (life science, environmental and industrial)



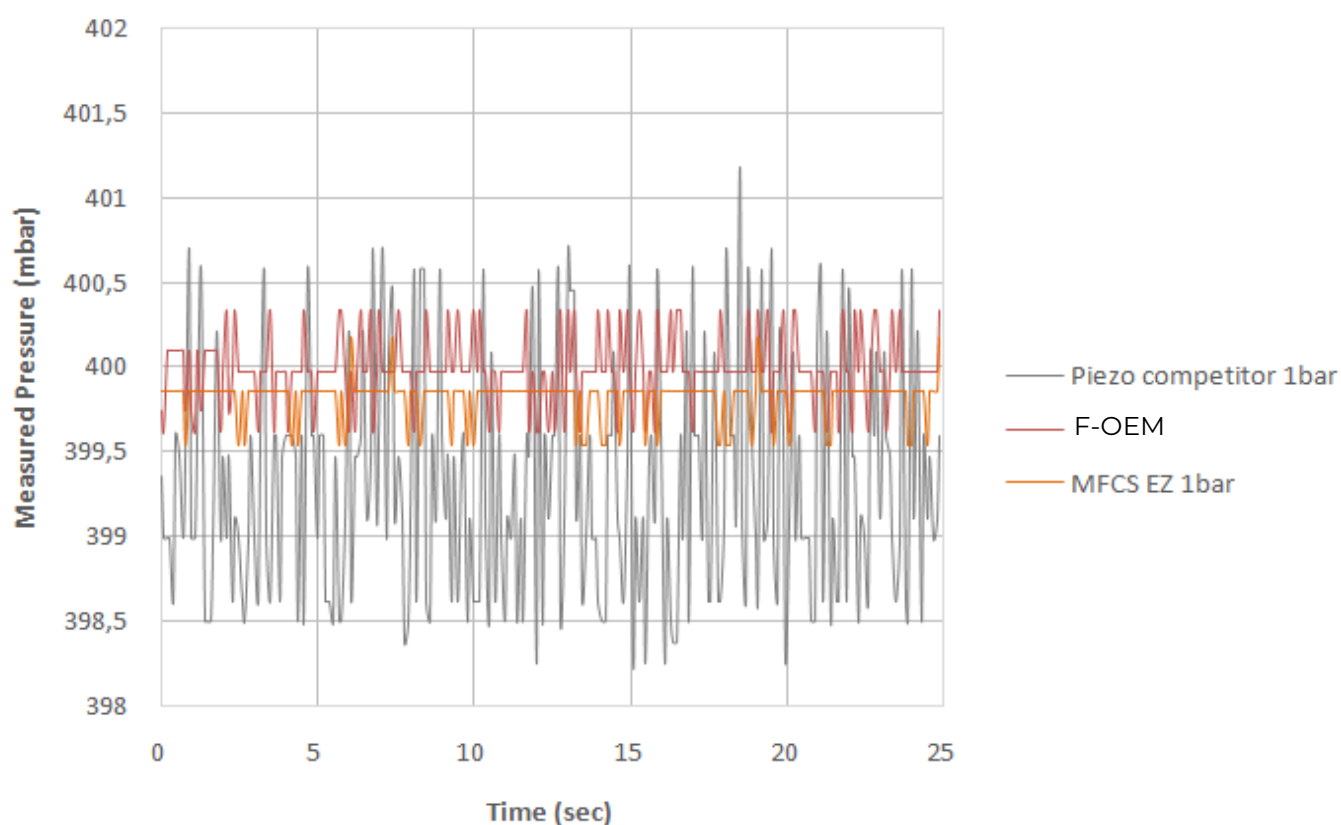
F-OEM components	
<b>Main board</b>	Main electronic board. 4 slots for pressure or switch modules. Extension slots available. Communication with USB or RS232
<b>Pressure modules</b>	<ul style="list-style-type: none"> <li>Pressure: 25 mbar (0.36 psi) / 69 mbar (0.9 psi) / 345 mbar (5 psi) / 1000 mbar (14.5 psi) / 2000 mbar (29 psi) / 7000 mbar (101 psi)</li> <li>Vacuum: -25 mbar (-0.36 psi) / -69 mbar (-0.9 psi) / -345 mbar (-5 psi) / -800 mbar (11.6 psi)</li> <li>"Push-Pull" pressure &amp; vacuum module: -800 mbar (-11.6 psi) to 1000 mbar (14.5 psi)</li> </ul>
<b>Switch modules</b>	F-OEM Switch control 4 x RJ45 ports
<b>Electrovalves modules</b>	F-OEM electrovalve control module for actuating up to 8 x 3/2 electrovalves or other ON/OFF state devices
Optional	
<b>FOEM connectors &amp; tubing kit</b>	USB Cable 1.8m (x1) 4mm pneumatic tubing (4m), 6mm pneumatic tubing (3m), double Y manifold 1x 6 mm to 4x 4 mm (x1), 4 mm red plug (x4)
<b>Power supply</b>	Power supply 108 W if using a Switch module Power supply 36 W without using Switch module
<b>Pressure source</b>	Positive pressure source with necessary tubing and fittings
<b>Vacuum source</b>	Negative pressure source with necessary tubing and fittings
<b>Cooling fan</b>	Cooling fan for pressure source
<b>Inline air dryer</b>	Air Pressure Source Cleaner
<b>Pressure regulator</b>	Pressure regulator if pressure of different ranges are used
<b>Standoffs</b>	On demand
<b>Valve to board custom electrical + pneumatic length</b>	On demand
<b>Manifold fittings</b>	On demand
<b>Pneumatic inlet/outlet inner diameter</b>	On demand

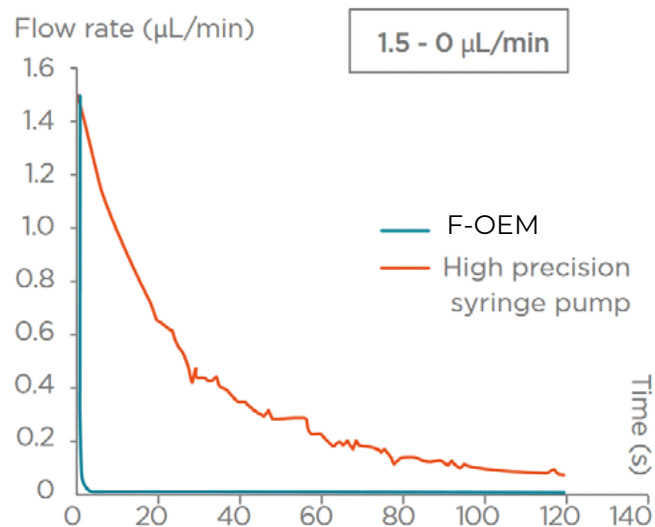
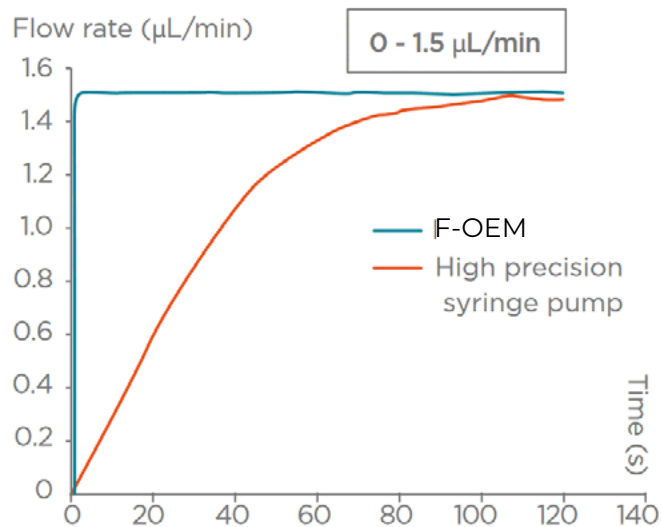
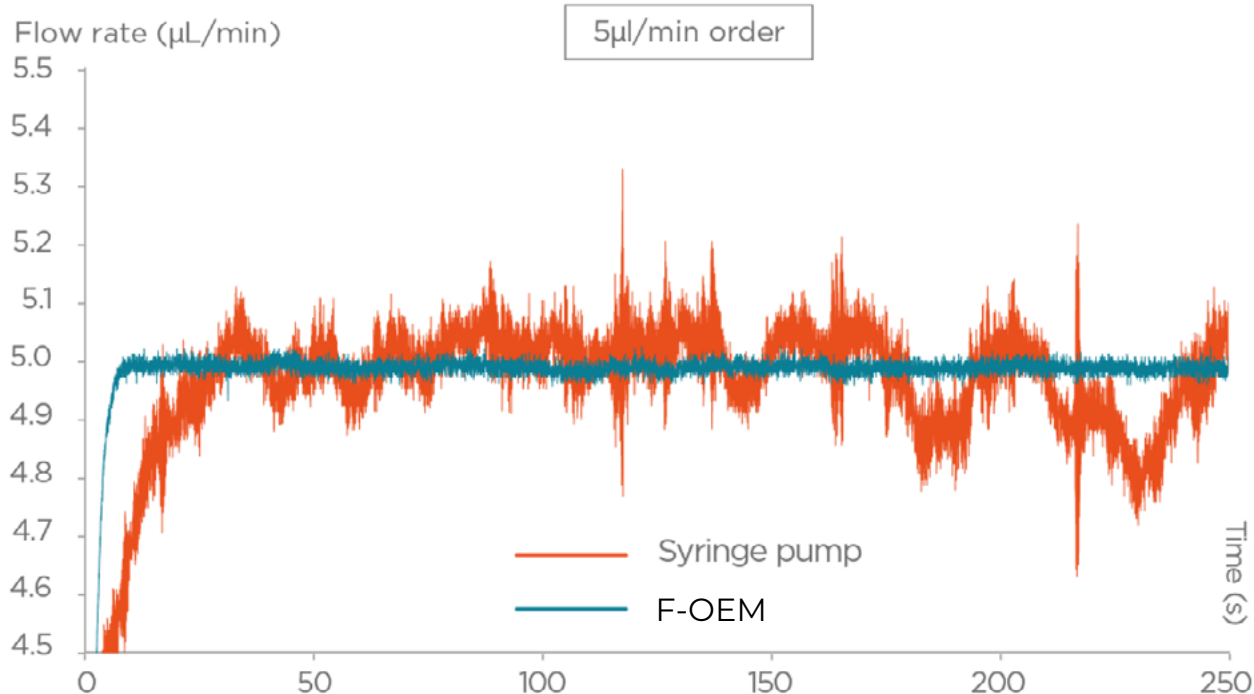


## Components that can be connected to the F-OEM

<b>FS series – bidirectional flow sensors</b> (Flow sensor input integrated into the F-OEM)	For flow-rate monitoring and control. We have a large range of flow-sensors ranging from 0-1.5 $\mu\text{L}/\text{min}$ to 0-5 $\text{mL}/\text{min}$ .
<b>Microfluidic valves</b> (Directly connected to the switch modules)	Inject and switch different flow paths. Valve and switch platform for directing the fluid flow, including bidirectional and rotary multi-port port valves <ul style="list-style-type: none"> <li>• Fluigent 2-X: 3-port/2-way microfluidic valve</li> <li>• Fluigent MX: 11-port / 10-way microfluidic valve for injection or selection of up to 10 different fluids.</li> <li>• Fluigent L-X: 6-port/2 position microfluidic valve. It is designed for precise sample injection or fluid recirculation in cell culture applications.</li> </ul>
Electrovalves and 3rd party components	<ul style="list-style-type: none"> <li>• The F-OEM electrovalve control module is developed for connecting and actuating up to 8 x 3/2 electrovalves per module. Please contact us for a selected 3/2 electrovalve reference</li> <li>• This valve system allows the efficient management of multiple pressure valves using one or two pressure controllers</li> <li>• It can also be used to control states of devices with ON/OFF states with 0-24V (3 W steady-state mode and 500 mA max transient for 100 ms)</li> </ul>

## Competitive stability at 400mbar





## PERFORMANCE - PRESSURE MODULE

Pressure ranges	Pressure : 0 to 7000 mbar (101 psi) Required pressure supply : 7100 mbar (103 psi) Maximum pressure supply : 7400 mbar (107.32 psi)
	Pressure: 0 to 2000 mbar (29 psi) Required pressure supply 2100 mbar (30.45 psi) Maximum pressure supply : 2600 mbar (37.7 psi)
	Pressure: 0 to 1000 mbar (14.5 psi) Required pressure supply : 1100 mbar (16 psi) Maximum pressure supply : 1400 mbar (20.3 psi)
	Pressure: 0 to 345 mbar (5 psi) Required pressure supply : 1100 mbar (16 psi) Maximum pressure supply : 1300 mbar (18.85 psi)
	Pressure: 0 to 69 mbar (0.9 psi) Required pressure supply : 150 mbar (2.18 psi) Maximum pressure supply : 300 mbar (4.35 psi)
	Pressure: 0 to 25 mbar (0.36 psi) Required pressure supply : 150 mbar (2.18 psi) Maximum pressure supply : 300 mbar (4.35 psi)
	Vacuum : -25 mbar (-0.36 psi) / -69 mbar (-0.9 psi) / -345 mbar (-5 psi) / -800 mbar Required vacuum supply : -800 mbar (-11.6 psi)
	Push-Pull : -800 mbar (-11.6 psi) to 1000 mbar (14.5 psi) Required pressure supply : 1100 mbar (16 psi) and required vacuum supply -800 mbar (-11.6 psi) (min) Maximum pressure supply : 1400 mbar (20.3 psi)
Pressure stability	<0.1% full scale - CV (on measured values)
Accuracy	0.25% full scale
Repeatability (1σ)	<0.01% full scale Standard deviation on mean values for same pressure order
Sensor resolution	0.03% of max pressure
Mechanical response time	Down to 30 ms
Settling time	<70 ms

## MECHANICAL

Weight	0.1 Kg (F-OEM OEM microfluidics flow controller), 0.4 Kg (per pressure module with manifold), 0.3 kg (per switch module or electrovalve module)
Dimensions	See Drawings
Noise	Low noise <20 dB
Manifold	Aluminium
Valve	FKM/FKM, Stainless Steel
Interior tubing	Silicon platinum
Pressure sensor	High temperature polyamide, Epoxy, Silicone gel
Exhaust restrictor	High temperature polyamide, Epoxy, Silicone gel
Operating temperature range	-10°C to 80°C
Storage temperature	-40° to 85°C
Operating humidity	0-95% HR
Storage humidity	0-95% HR

<b>Internal leakage</b>	0.36 l/min Depends on range and pressure. Measure done on a 1 bar FOEM at 500 mbar.
<b>Sensor type</b>	Piezzo resistive silicon pressure sensor
<b>Pneumatic connections</b>	OD 4mm female push in fitting (on standard version, can be fittingless, then it is an M5 thread)
<b>Mounting type</b>	M3 screws
<b>Gas compatibility</b>	Pressurized or bottled clean dry and non-corrosive or explosive gas (Ambient air, N2, Ar, CO2) (O2 could be a
<b>Gas temperature</b>	4°C to 37°C

## ELECTRICAL AND CONTROL PROPERTIES

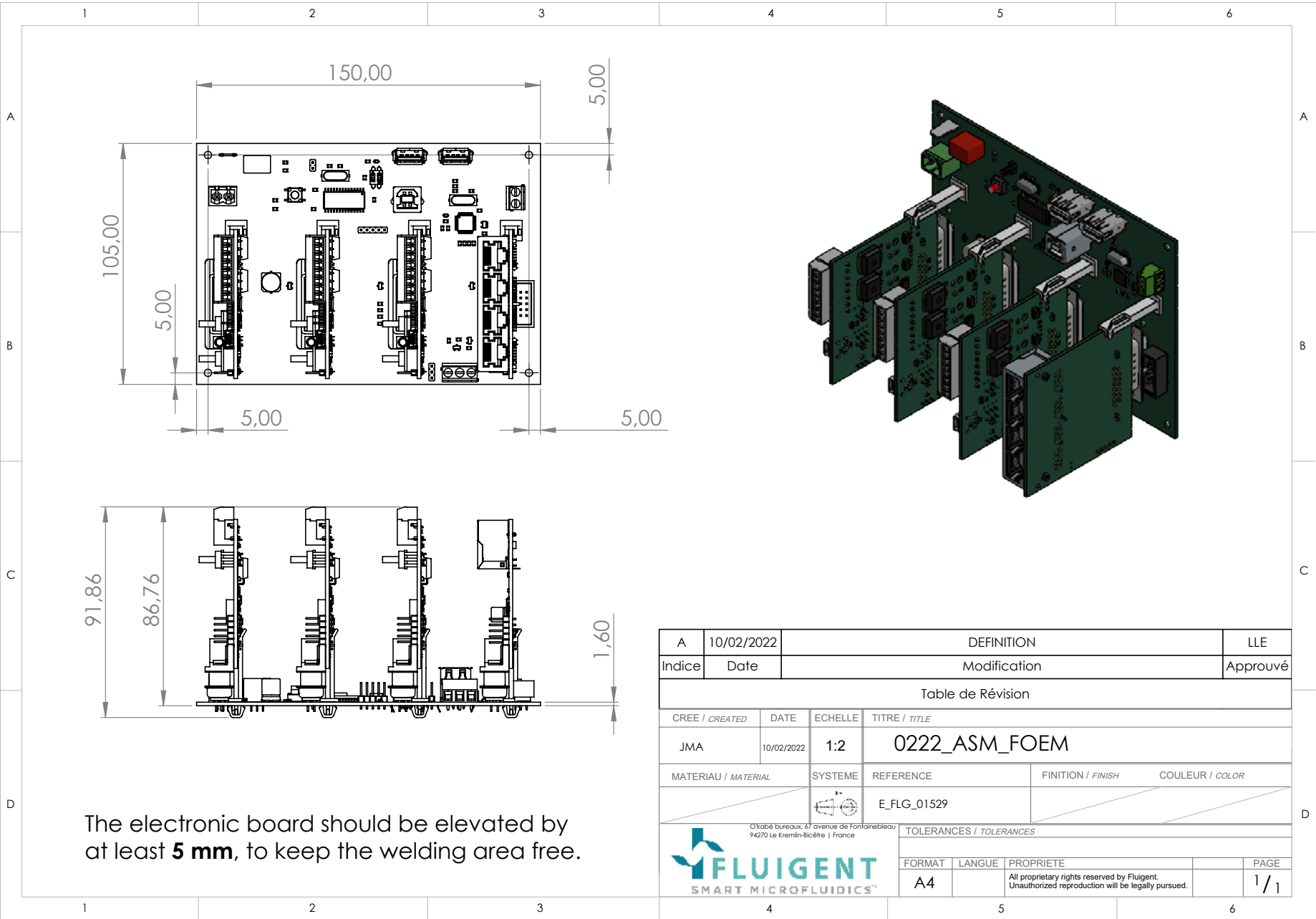
<b>Digital communication interface</b>	USB (standard board), RS232 (alternative board) + other protocols on demand
<b>Readout sample times</b>	5 ms
<b>RS232 connection</b>	Sub DB9
<b>Power supply connector type</b>	Phoenix contact MSTBA 2.5
<b>Power supply</b>	External power, 2A or 7A available from standard, but custom can be accepted using MBPT terminal block connection 0-24VDC, digital controlled output 5 or 24 volts selectable
<b>Build-in power modules</b>	24 VDC – up to 7A (168W) maximum
<b>Current supply</b>	Depends on configuration
<b>Maximum power consumption</b>	>1W groundable for F-OEM microfluidics flow controller (can be increased depending on peripherals, eg pump, fans etc) – 6W maximum per FEZ module, 48W maximum per Switch module (rotary valves ~ 12W)
<b>Data Update Rate - data refresh rate</b>	50 Hz
<b>Digital Data Update Rate - internal refresh rate</b>	50 Hz
<b>Digital communication protocol</b>	USB, RS232
<b>Flow sensor connection</b>	Mini-USB connection
<b>Switch and valve connection RJ45</b>	RJ45 female (or 2wire terminal block for SWEZ lite)
<b>Switch connection lite version</b>	Cable terminal 2 wire
<b>Additional USB ports</b>	2 x USB2.0 ports (available only on the USB connection protocol version)
<b>Compatible Operated System (OS)</b>	Windows, Linux, ARM, raspberry, MAC
<b>Software control</b>	OxyGen or SDK

## FLUIGENT'S PRODUCT COMBINATION

<b>Flow control</b>	Liquid flow rate sensor input, customizable to work with third party sensors (through SDK).
<b>Switch and Valve control</b>	Control up to 4 microfluidic valves per module using the Switch module [SWM-FOEM-4]. Compatible with Fluigent 2 position switches and rotary valves (M-switch OEM, L-switch OEM, 2-switch OEM).  Control ON/OFF states of up to 8x 3/2 electrovalves or other binary state 0-24V systems

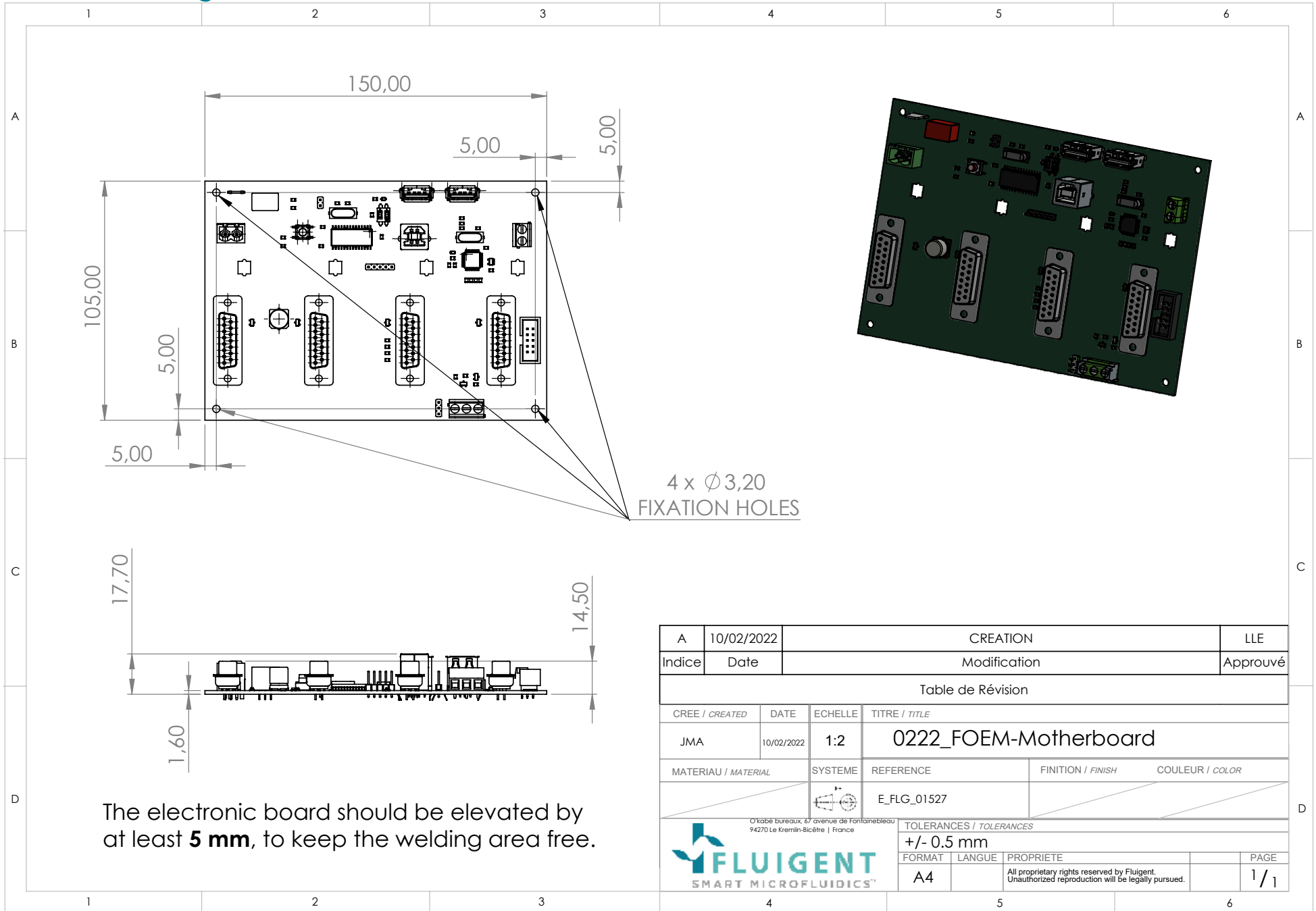
2D AND 3D FILES *(Dimensions are all in mm)*

1. integration Board



## 1. integration Board

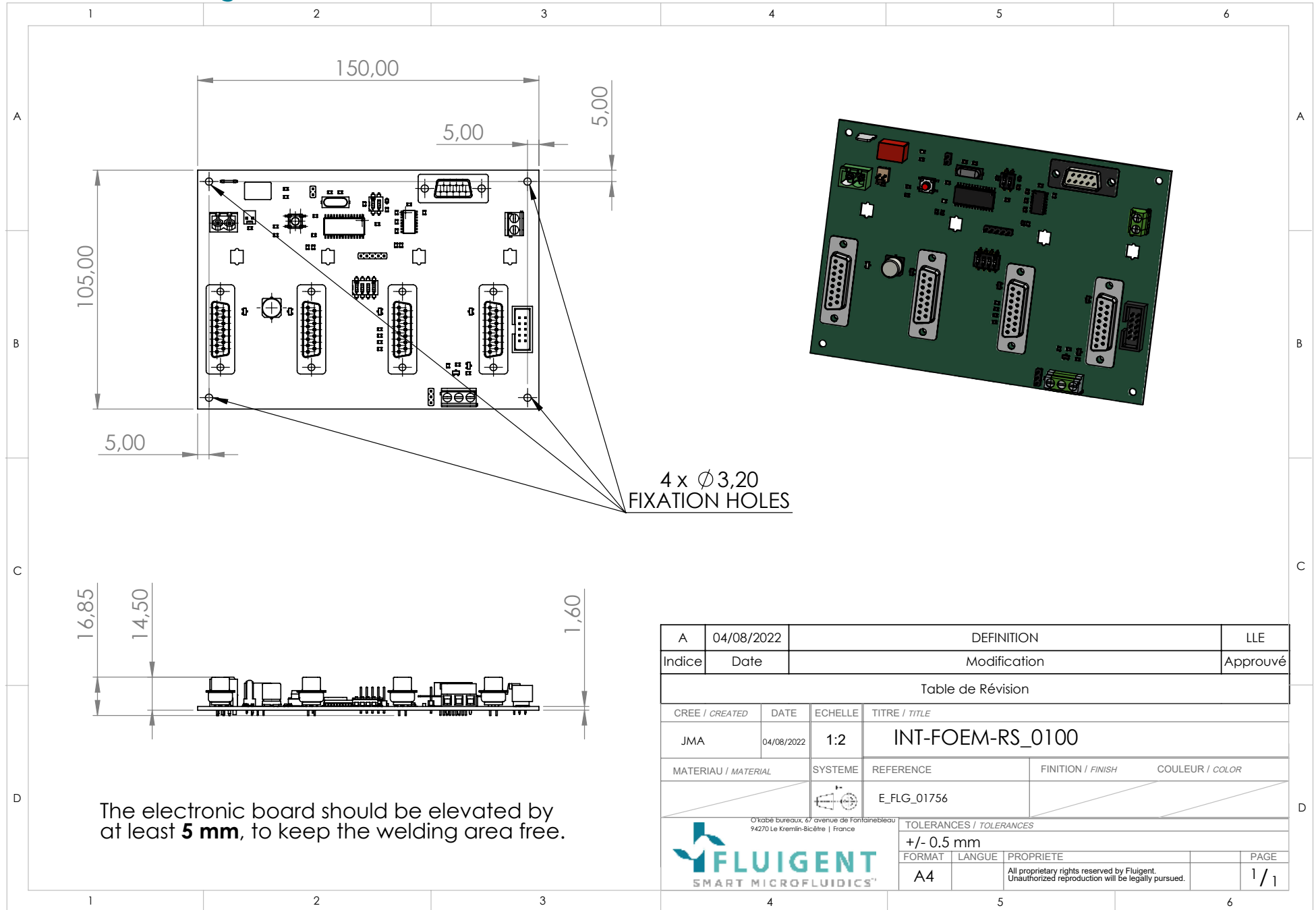
### • USB integration board





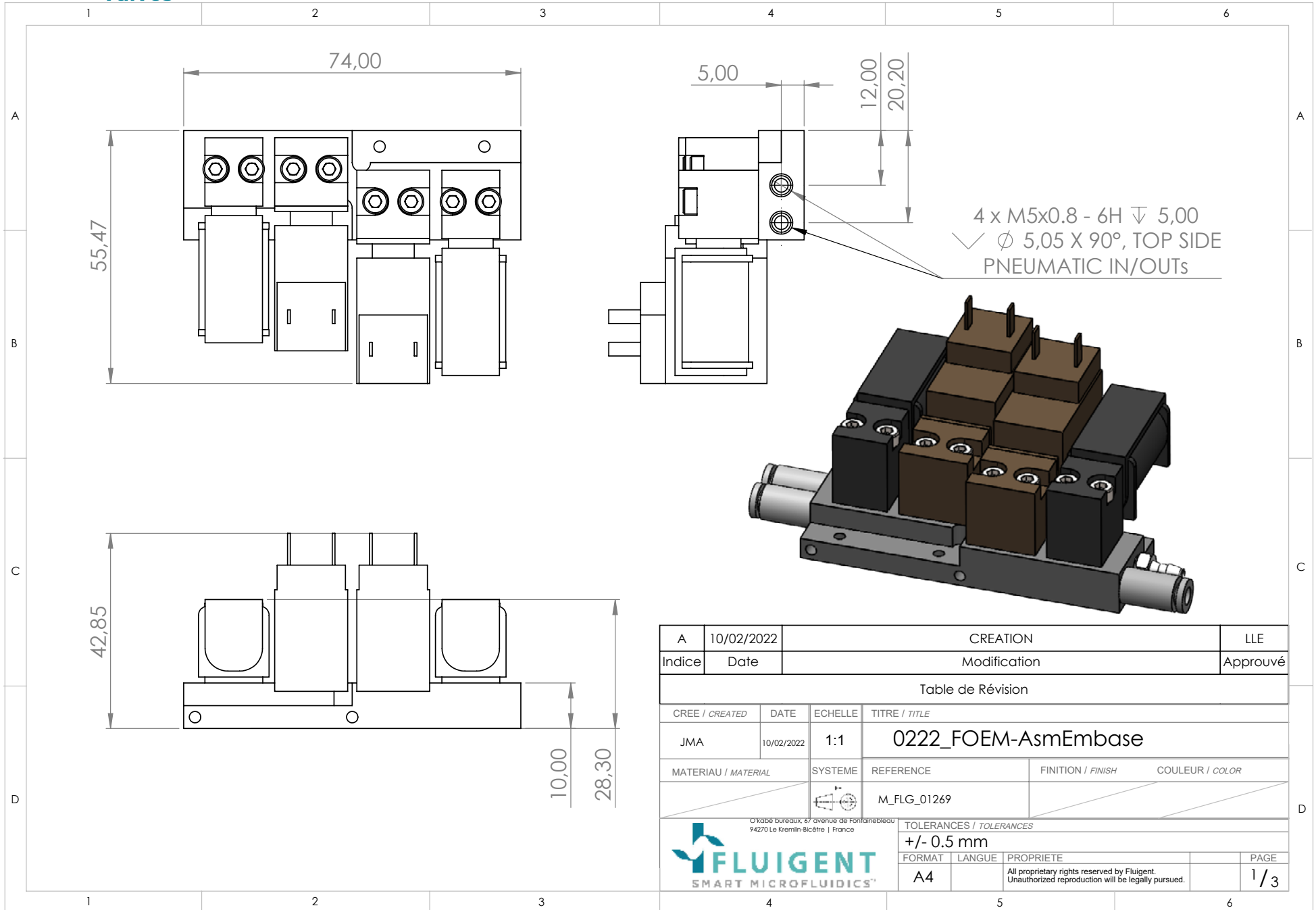
# 1. integration Board

## • RS232 integration board



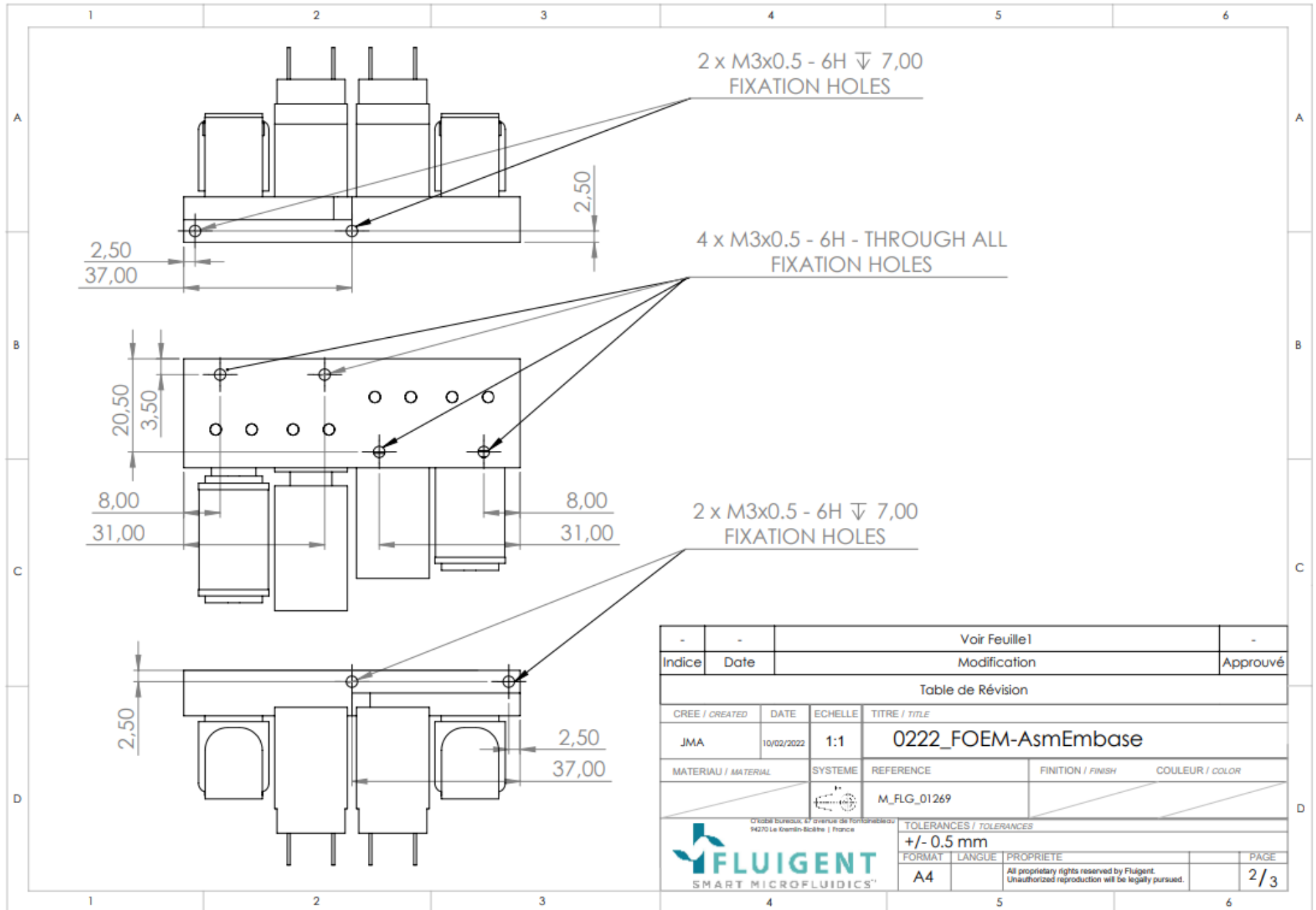
## 2. Pressure module

### • Valves



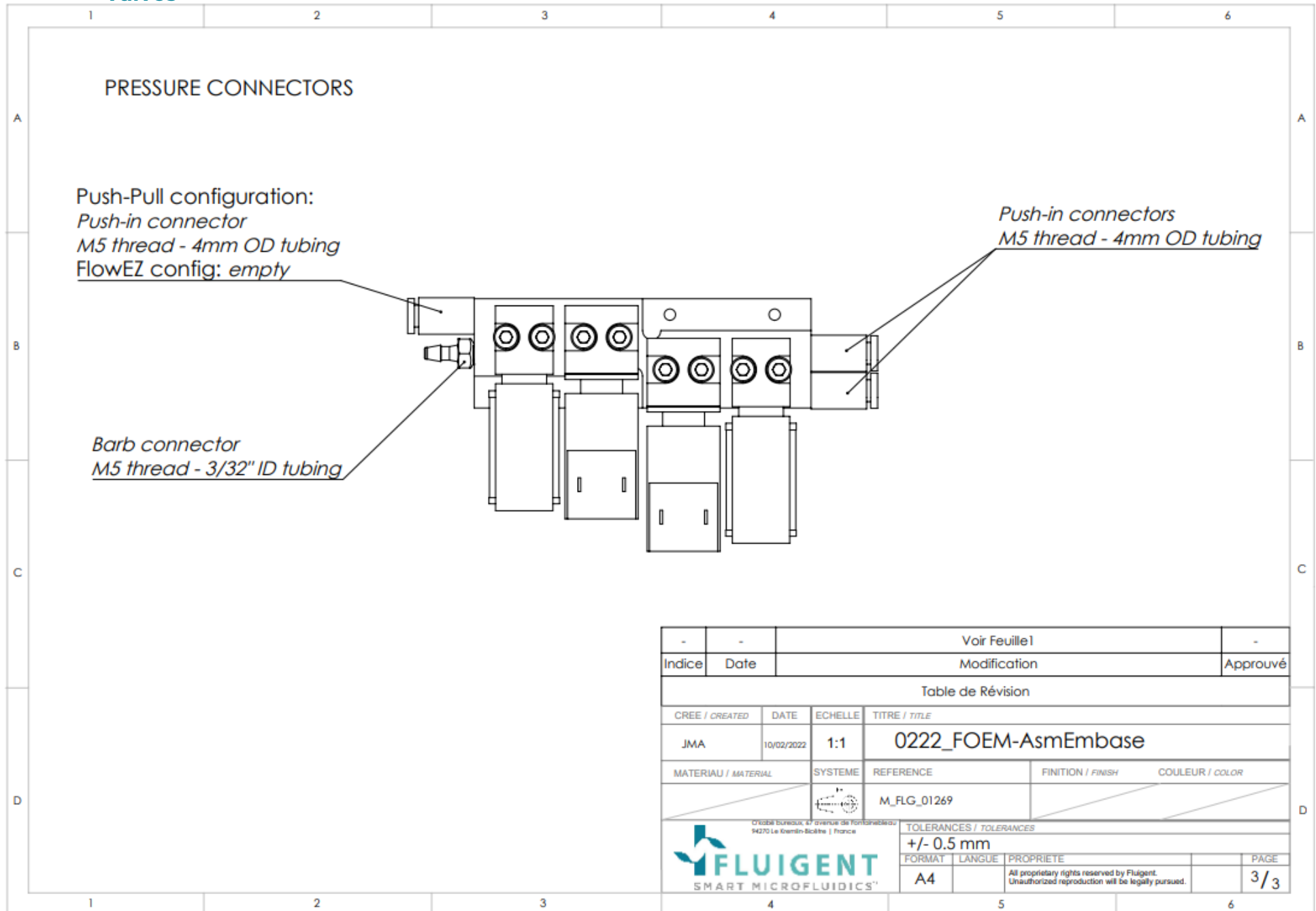
## 2. Pressure module

### • Valves



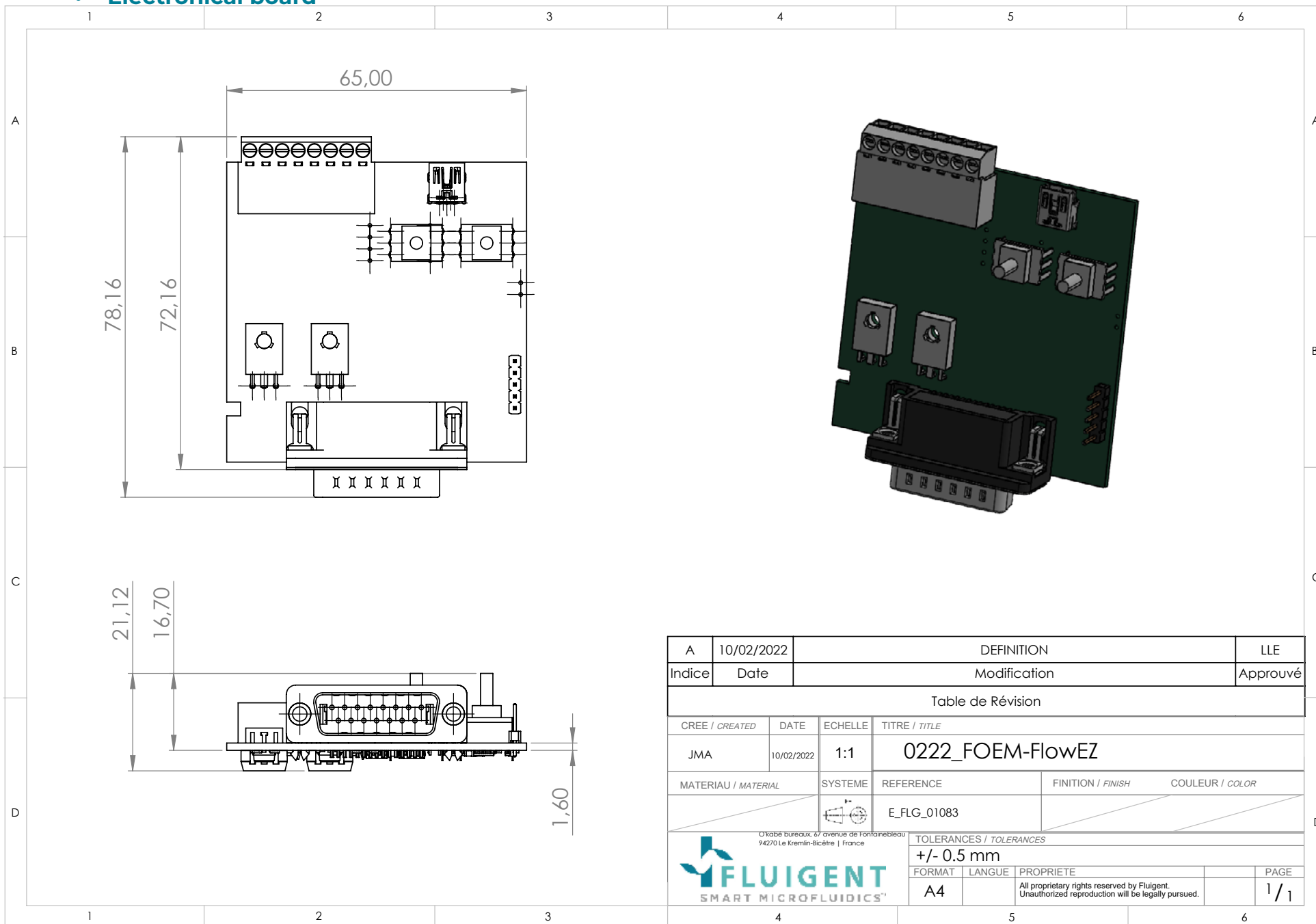
## 2. Pressure module

### • Valves

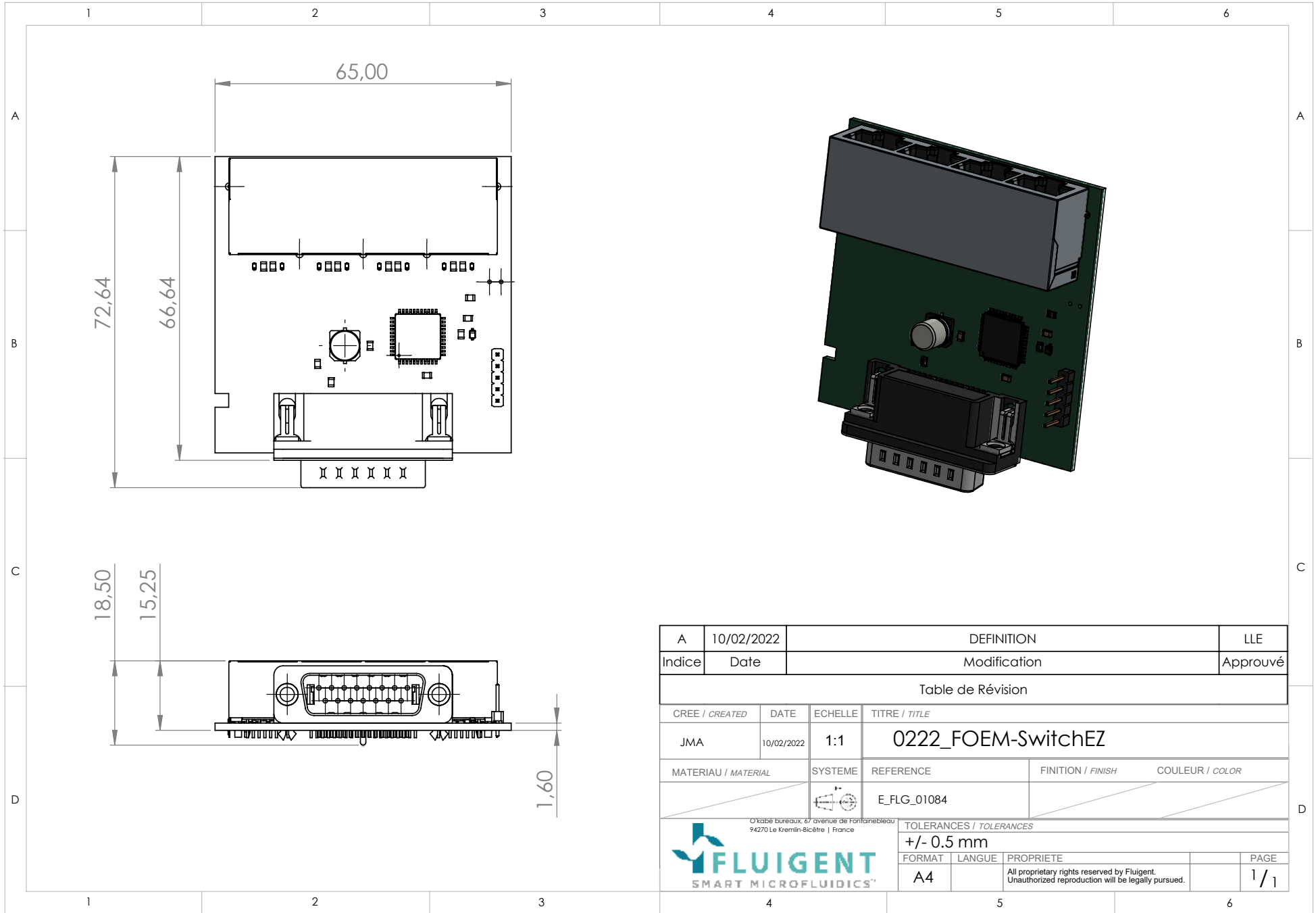




## 2. Pressure module

- Electronical board

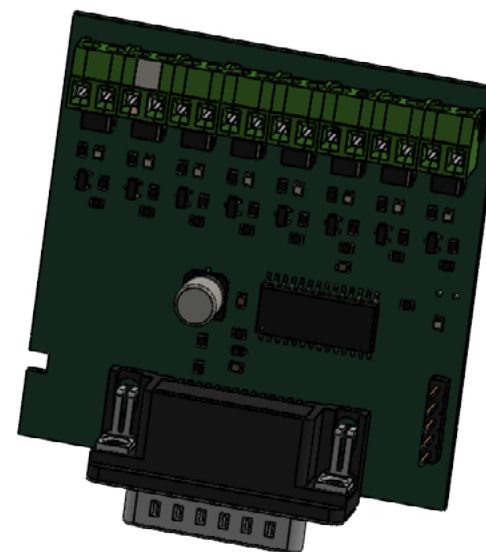
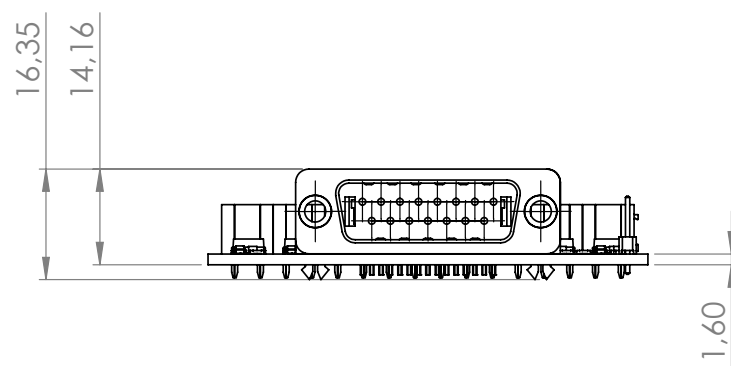
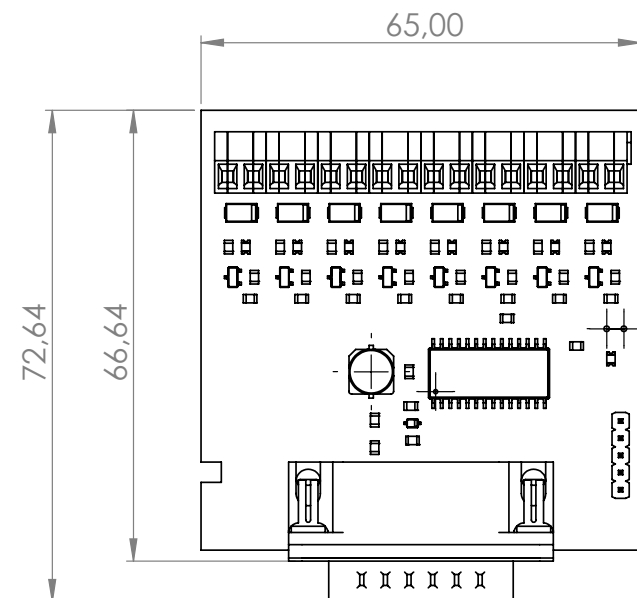




### 3. Switch module



A	10/02/2022	DEFINITION			LLE
Indice	Date	Modification			Approuvé
Table de Révision					
CREE / CREATED	DATE	ECHELLE	TITRE / TITLE		
JMA	10/02/2022	1:1	0222_FOEM-SwitchEZ		
MATERIAU / MATERIAL		SYSTEME	REFERENCE	FINITION / FINISH	COULEUR / COLOR
			E_FLG_01084		
 Oxabad bureaux, 67 avenue de Fontainebleau 94270 Le Kremlin-Bicêtre   France			TOLERANCES / TOLERANCES		
			+/- 0.5 mm		
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#### 4. Electrovalve module



A	04/08/2022	DEFINITION		LLE
Indice	Date	Modification		Approuvé
Table de Révision				
CREE / CREATED	DATE	ECHELLE	TITRE / TITLE	
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			E_FLG_01755	
 <b>FLUIGENT</b> SMART MICROFLUIDICS™			TOLERANCES / TOLERANCES +/- 0.5 mm	
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