

F-OEM

A MODULAR PRESSURE & FLOW CONTROL PLATFORM FOR INDUSTRY

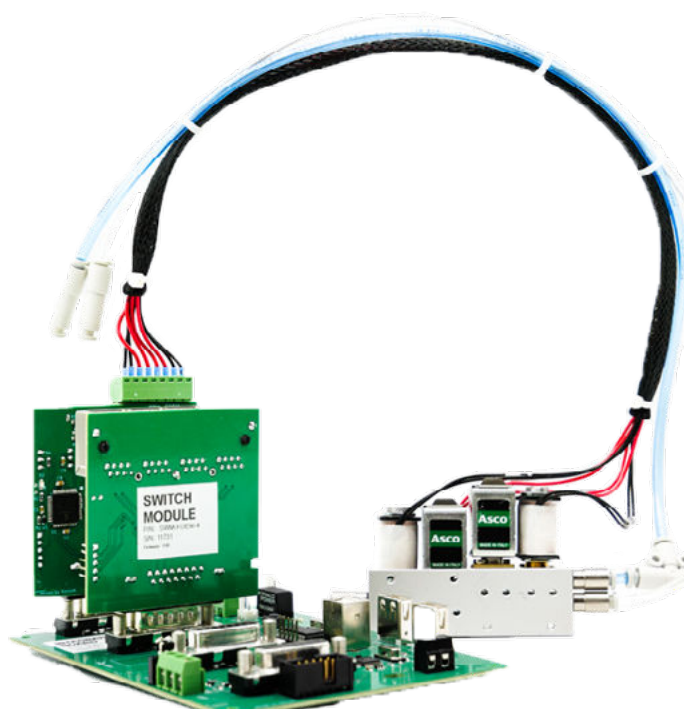
Our F-OEM offers our highest performance, efficiency, and widest pressure and flow rate ranges to support the most demanding industrial applications, including microfluidic and nanofluidic applications (microchannels, nanochannels, capillaries, lab on a chip...).

Key features:

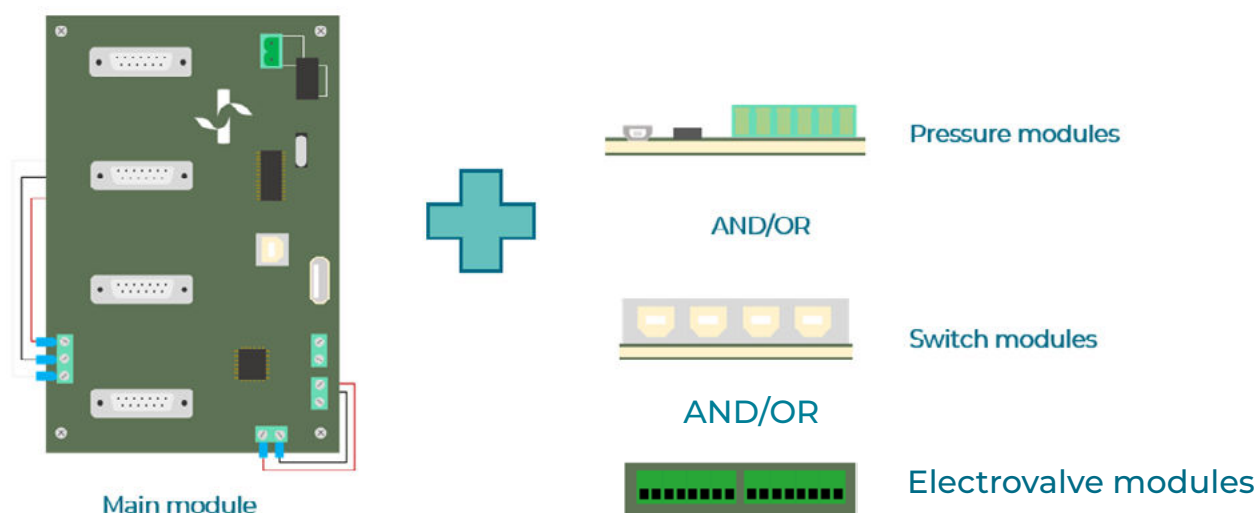
- Best performance: Excellent response time, pulseless and highly stable flow rate
- Flexible: Configurable with pressure and switch modules
- Compact: Standalone platform
- Contamination-free: not in contact with liquid

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)



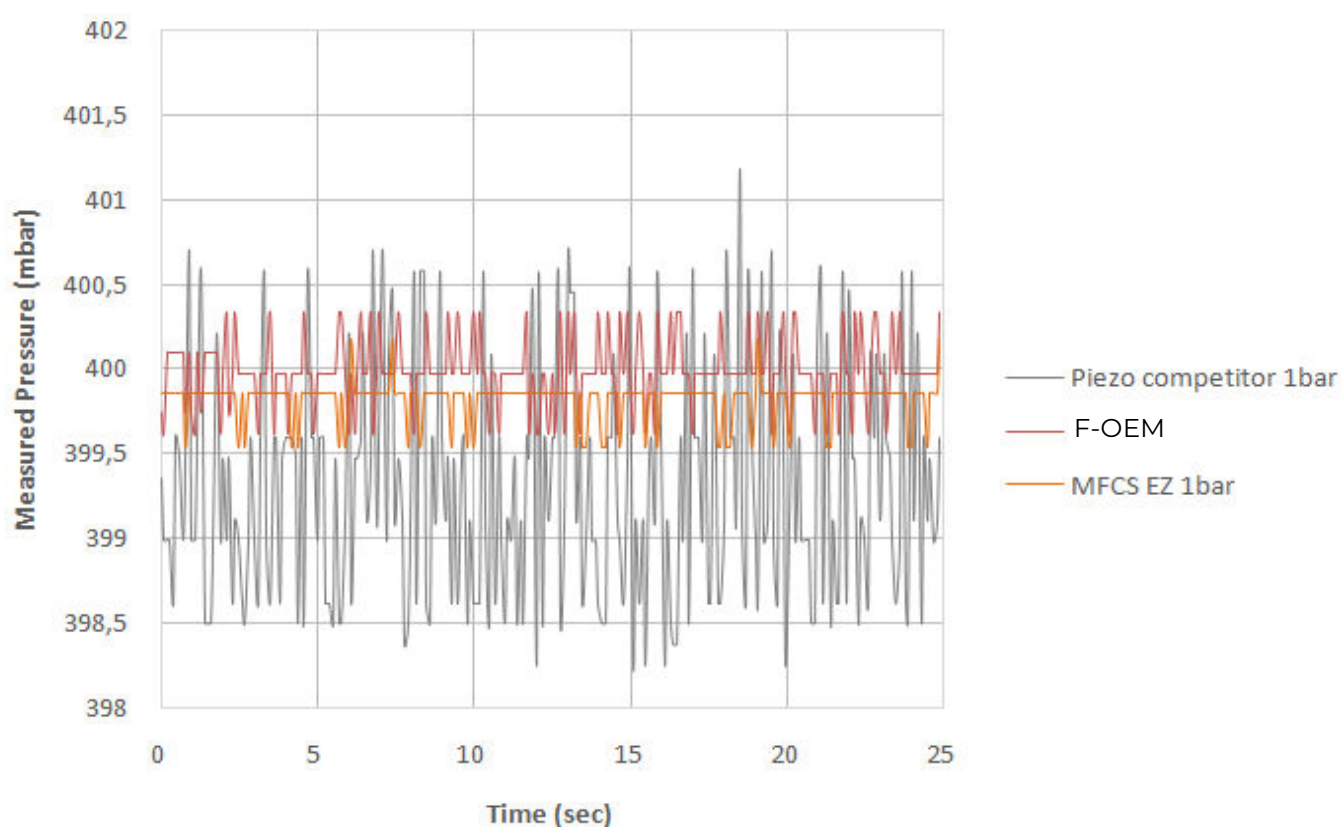
F-OEM components	
Main board	Main electronic board. 4 slots for pressure or switch modules. Extension slots available. Communication with USB or RS232
Pressure modules	- Pressure: 25 mbar (0.36 psi) / 69 mbar (0.9 psi) / 345 mbar (5 psi) / 1000 mbar (14.5 psi) / 2000 mbar (29 psi) / 7000 mbar (101 psi) - Vacuum: -25 mbar (-0.36 psi) / -69 mbar (-0.9 psi) / -345 mbar (-5 psi) / -800 mbar (11.6 psi) "Push-Pull" pressure & vacuum module: -800 mbar (-11.6 psi) to 1000 mbar (14.5 psi)
Switch modules	F-OEM Switch control 4 x RJ45 ports
Electrovalves modules	F-OEM electrovalve control module for actuating up to 8 x 3/2 electrovalves or other ON/OFF state devices
Optional	
FOEM connectors & tubing kit	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)
Power supply	Power supply 108 W if using a Switch module Power supply 36 W without using Switch module
Pressure source	Positive pressure source with necessary tubing and fittings
Vacuum source	Negative pressure source with necessary tubing and fittings
Cooling fan	Cooling fan for pressure source
Inline air dryer	Air Pressure Source Cleaner
Pressure regulator	Pressure regulator if pressure of different ranges are used
Standoffs	On demand
Valve to board custom electrical + pneumatic length	On demand
Manifold fittings	On demand
Pneumatic inlet/outlet inner diameter	On demand

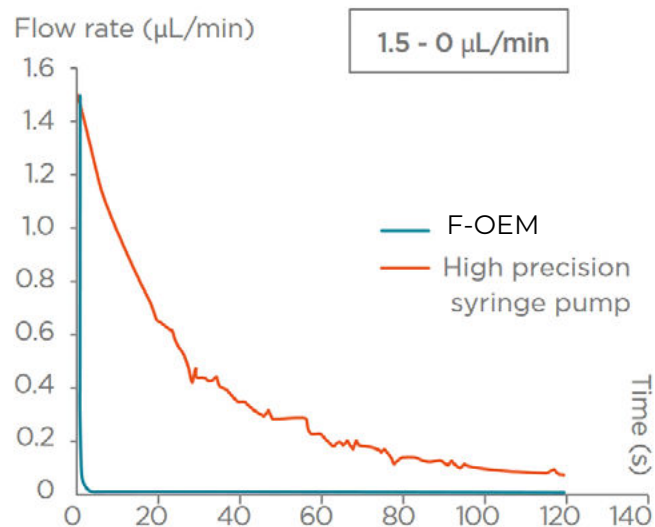
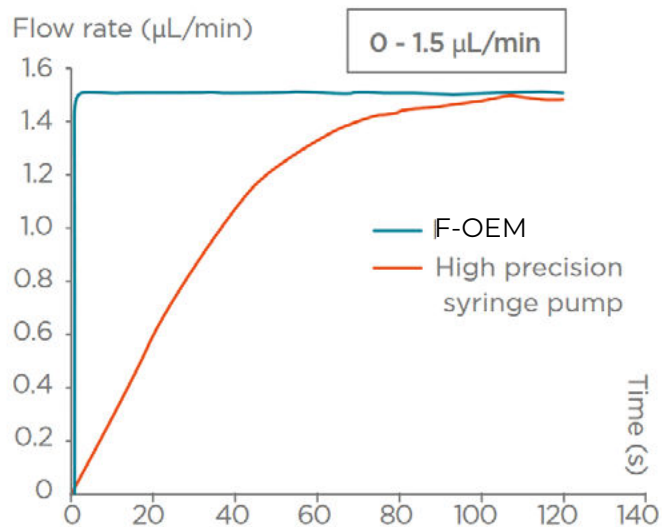
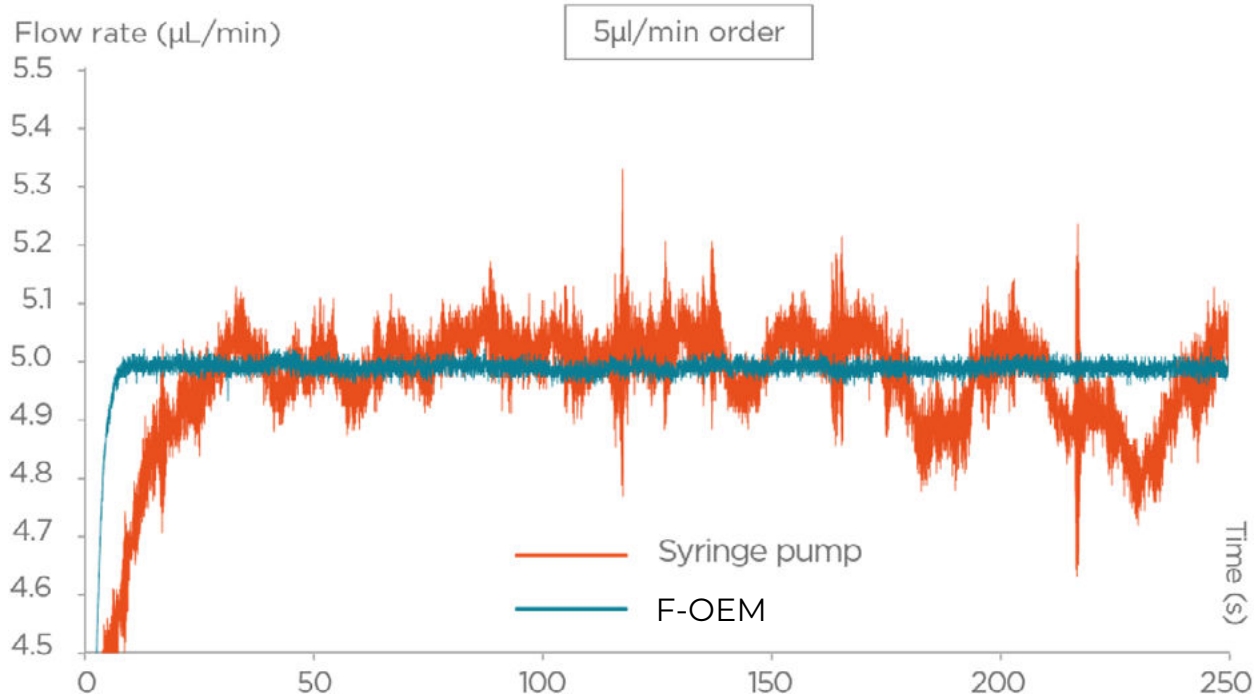


Components that can be connected to the F-OEM

FS series – bidirectional flow sensors (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 mL/min .
Microfluidic valves (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 • Fluigent 2-X: 3-port/2-way microfluidic valve • Fluigent MX: 11-port / 10-way microfluidic valve for injection or selection of up to 10 different fluids. • Fluigent L-X: 6-port/2 position microfluidic valve. It is designed for precise sample injection or fluid recirculation in cell culture applications.
Electrovalves and 3rd party components	• 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 • This valve system allows the efficient management of multiple pressure valves using one or two pressure controllers • 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)

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

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

ELECTRICAL AND CONTROL PROPERTIES

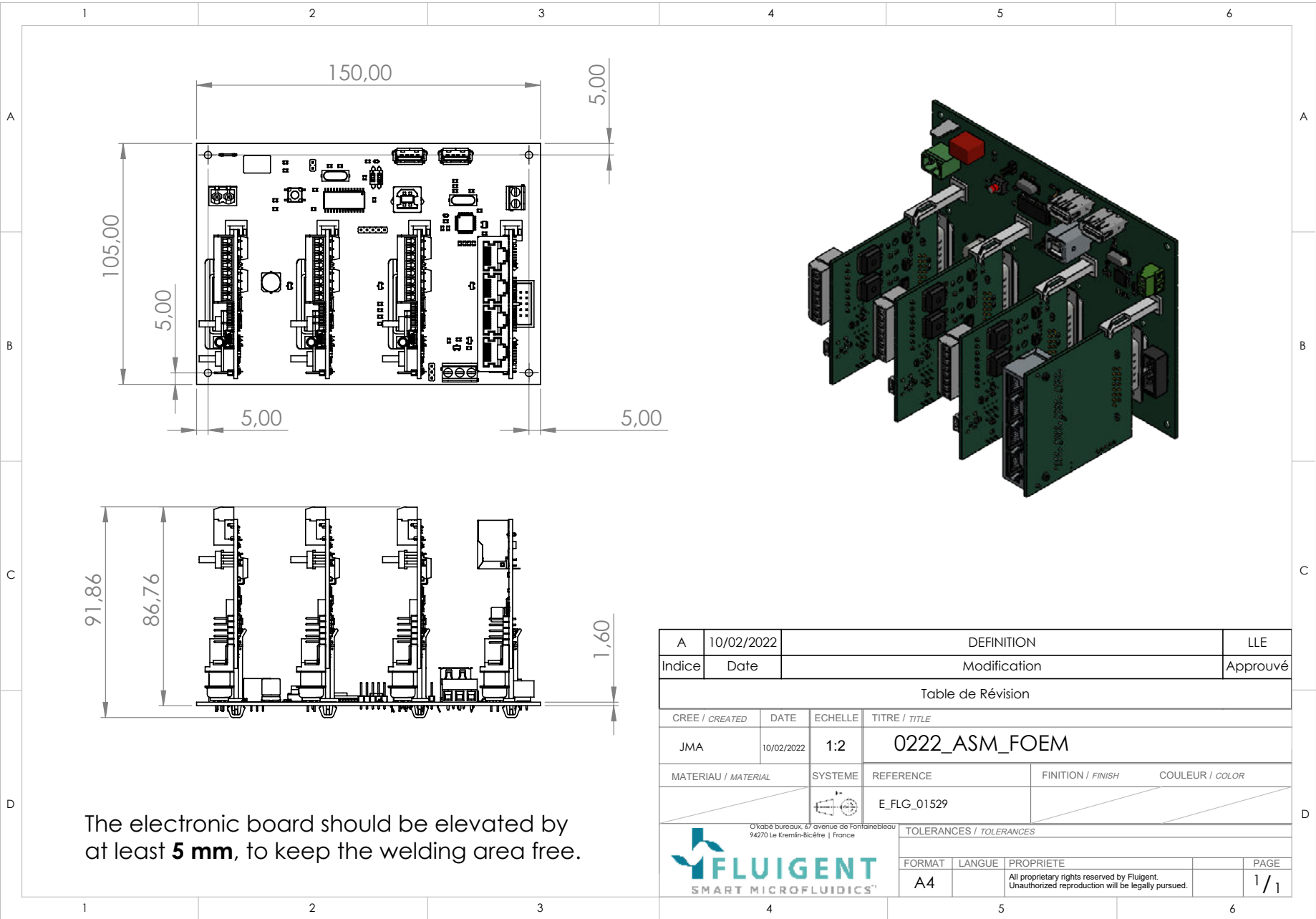
Digital communication interface	USB (standard board), RS232 (alternative board) + other protocols on demand
Readout sample times	5 ms
RS232 connection	Sub DB9
Power supply connector type	Phoenix contact MSTBA 2.5
Power supply	External power, 2A or 7A available from standard, but custom can be accepted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

FLUIGENT'S PRODUCT COMBINATION

Flow control	Liquid flow rate sensor input, customizable to work with third party sensors (through SDK).
Switch and Valve control	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

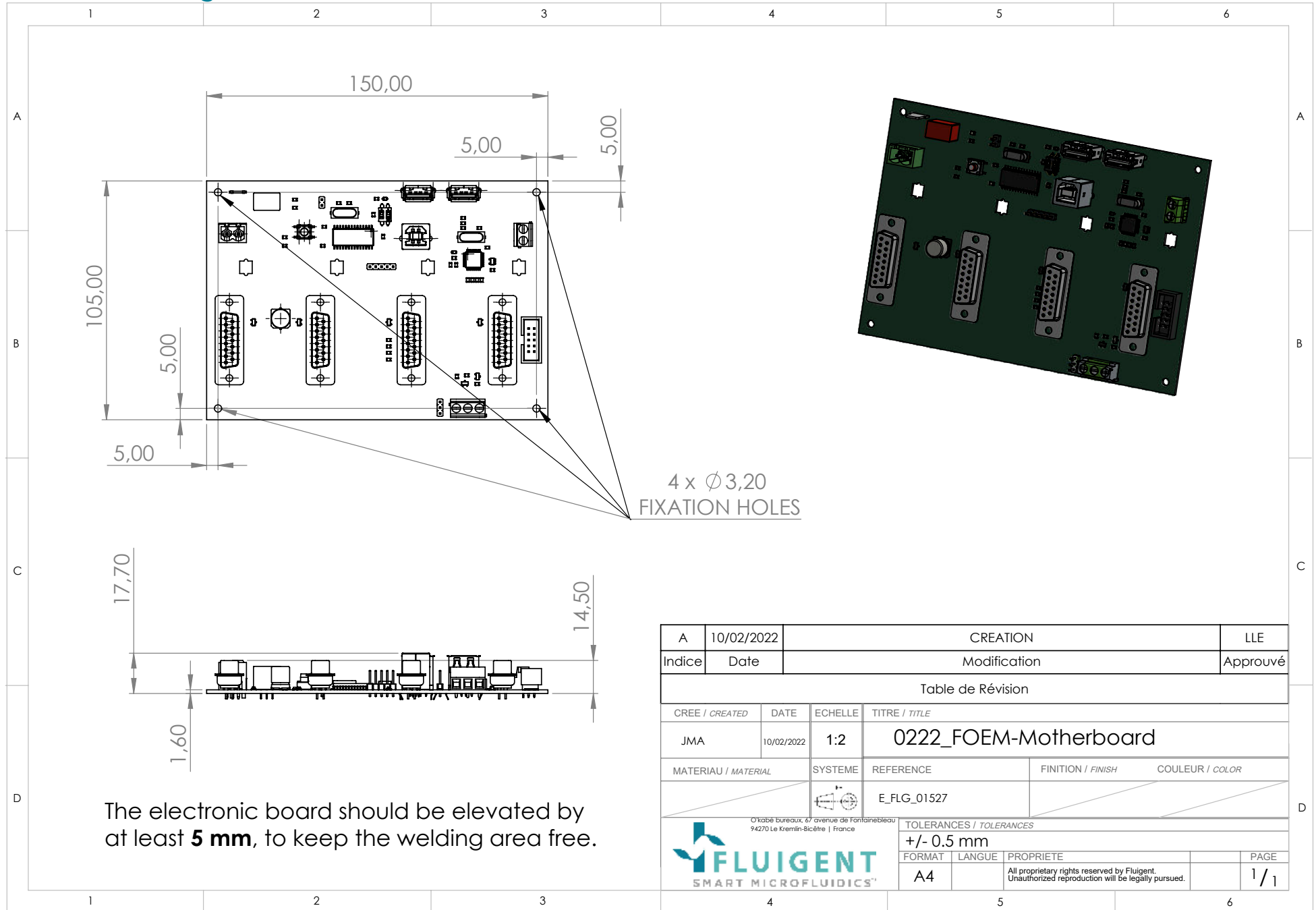
2D AND 3D FILES *(Dimensions are all in mm)*

1. integration Board



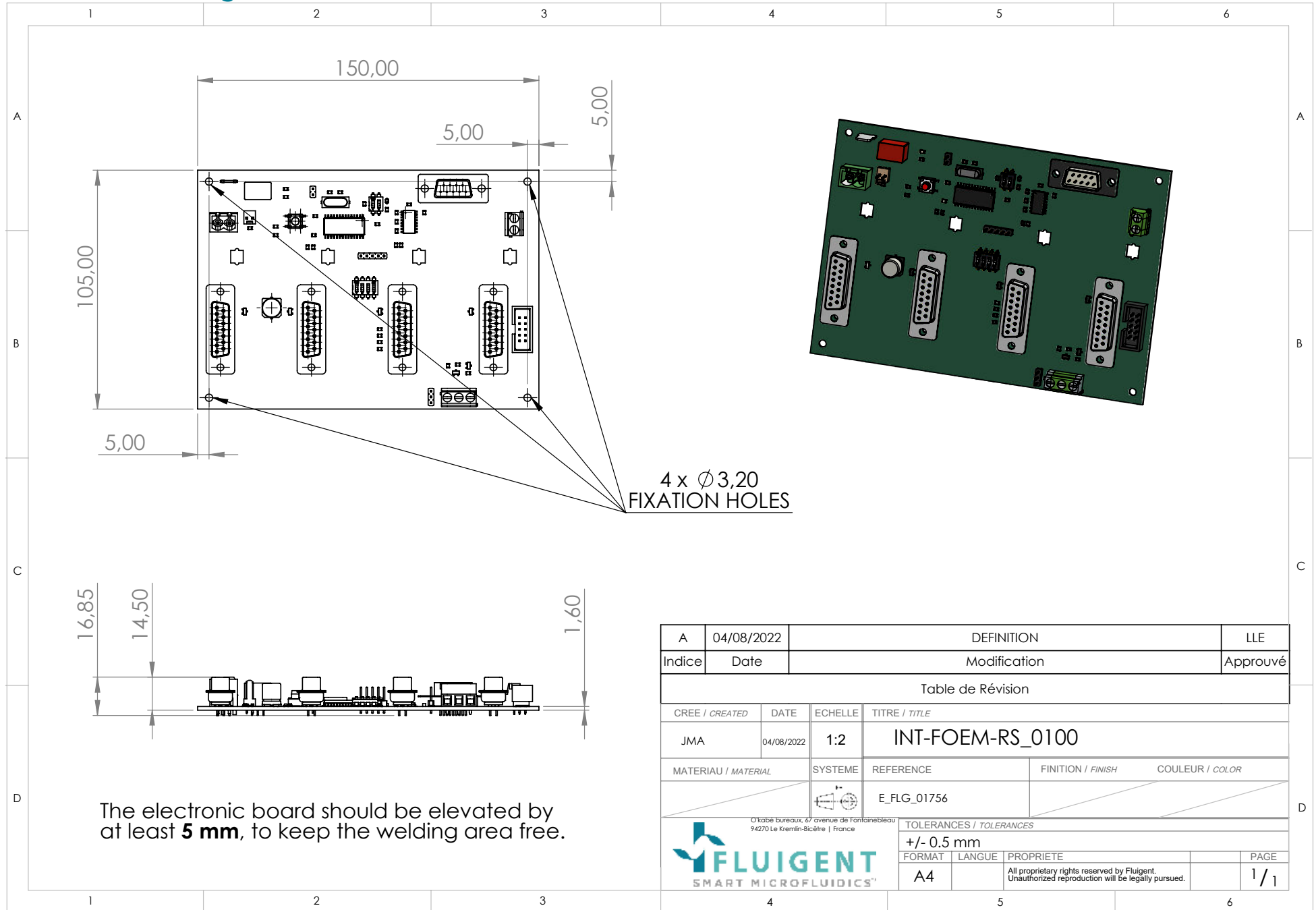
1. integration Board

• USB integration board



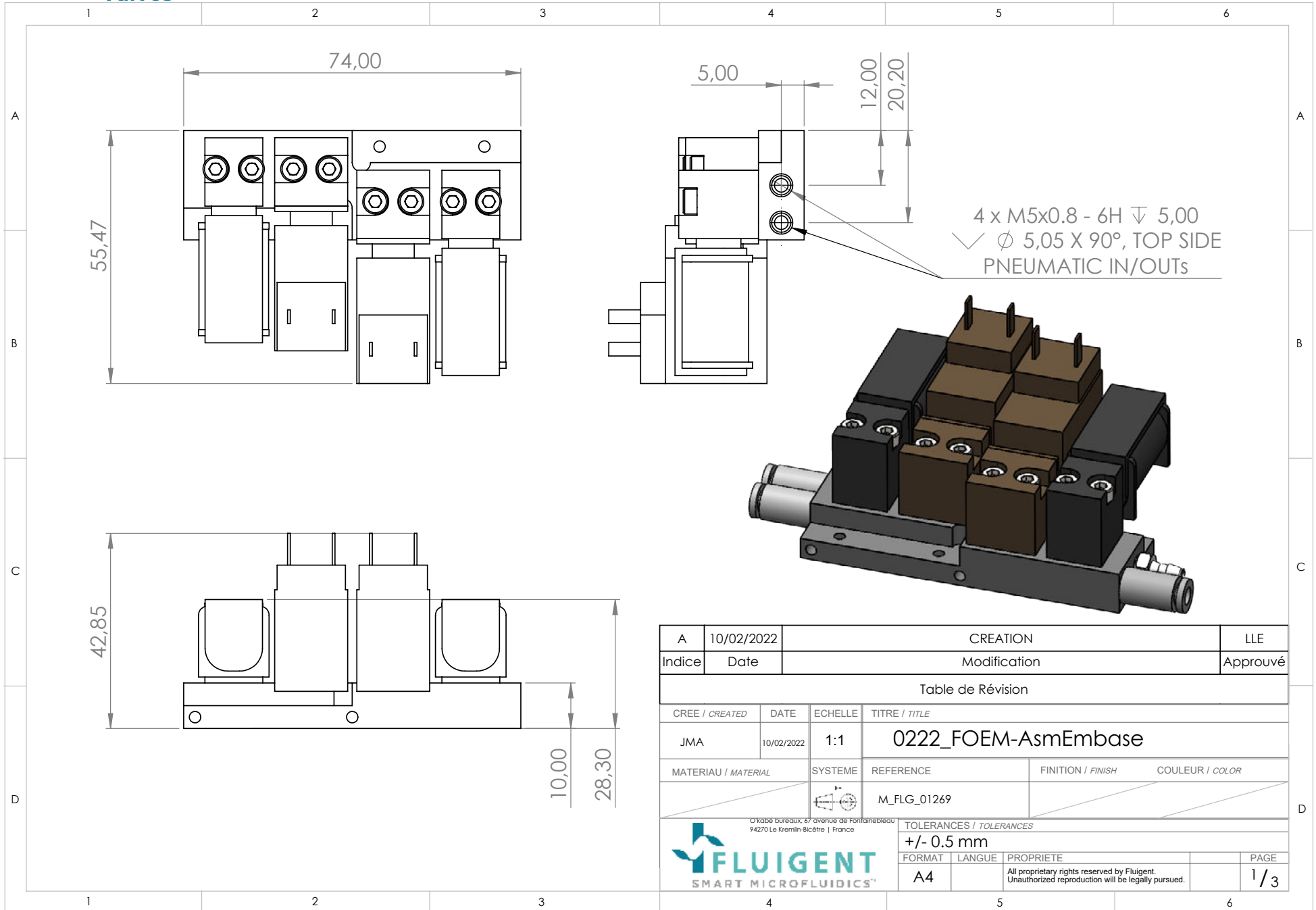
1. integration Board

• RS232 integration board



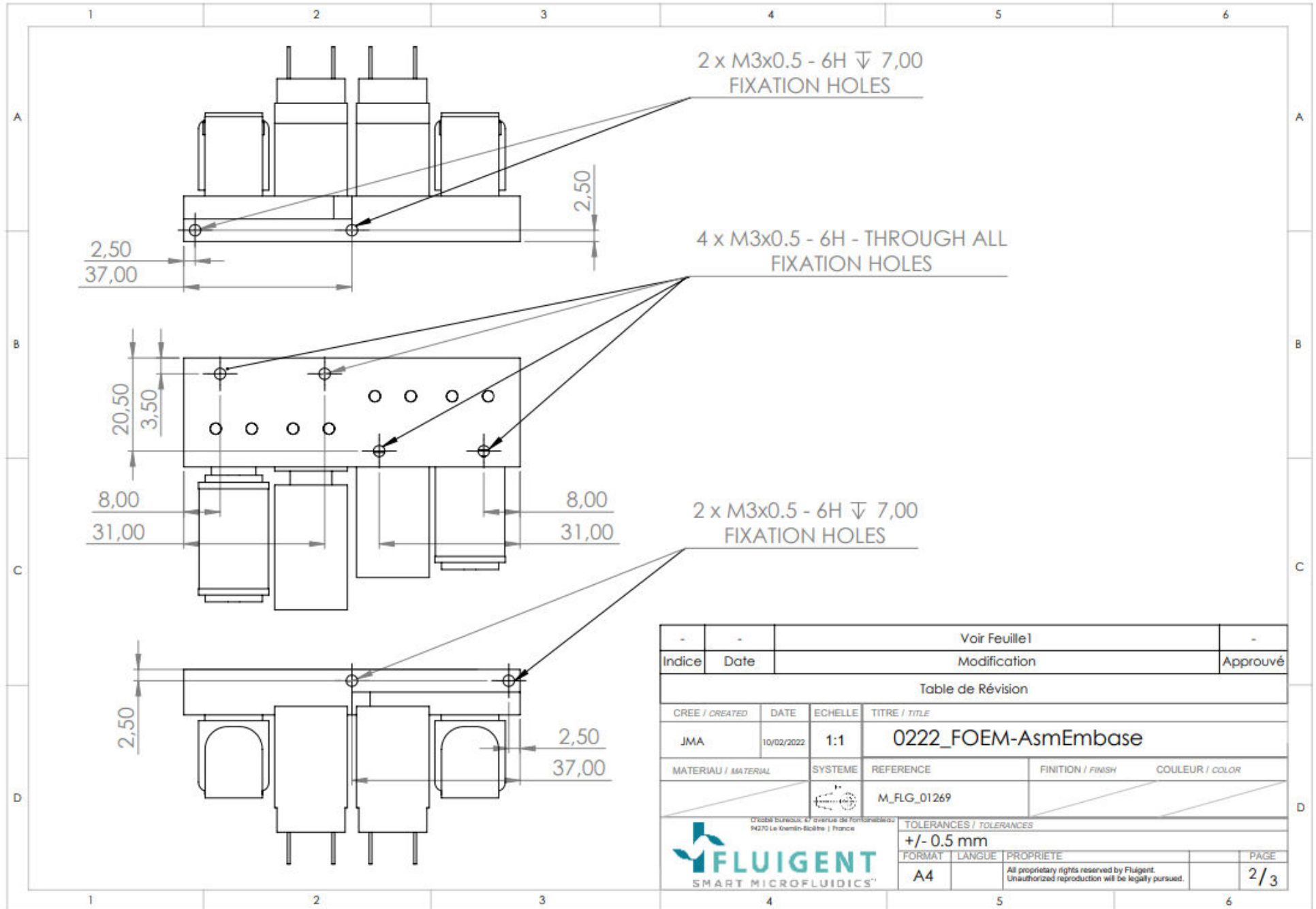
2. Pressure module

• Valves



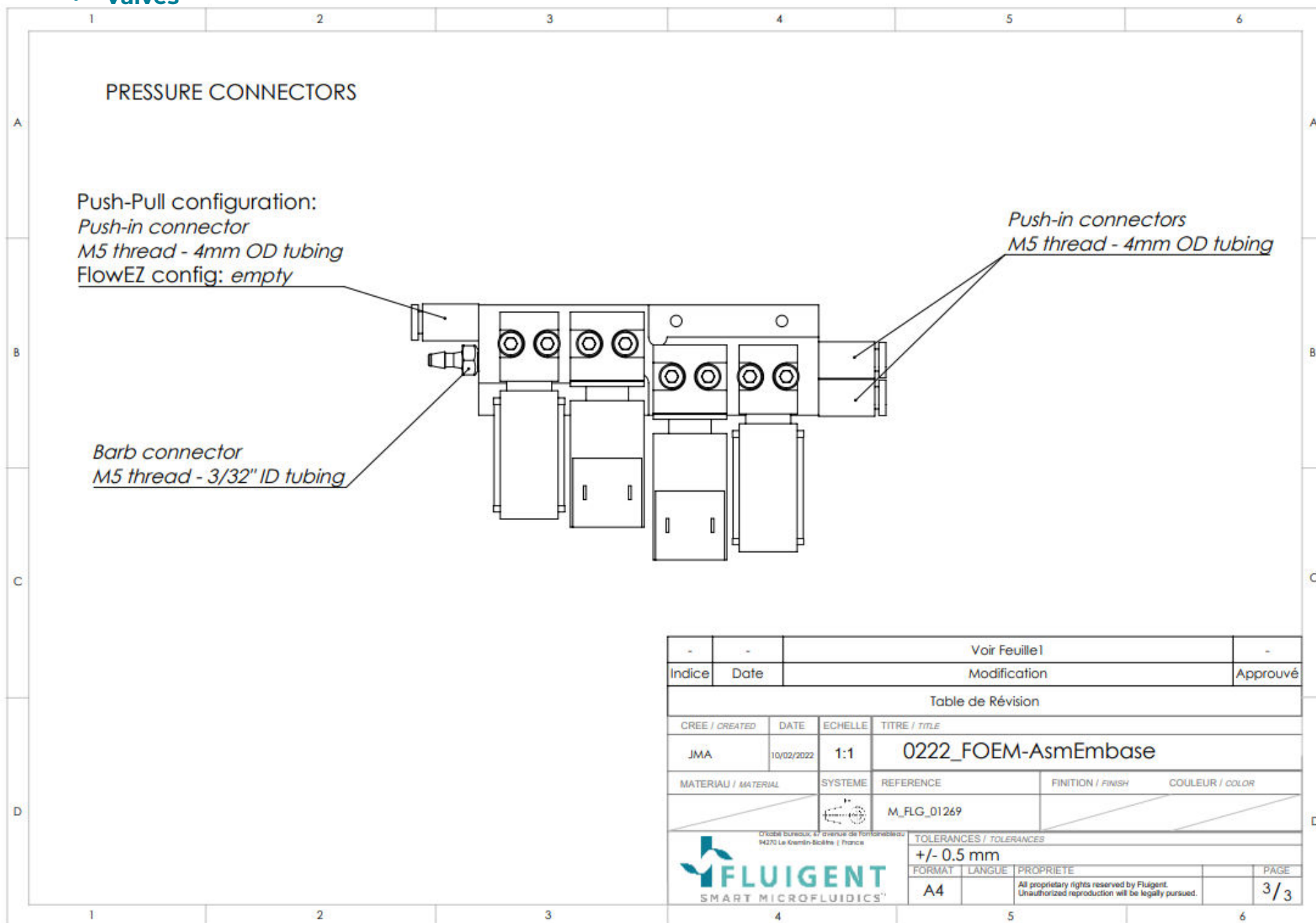
2. Pressure module

• Valves



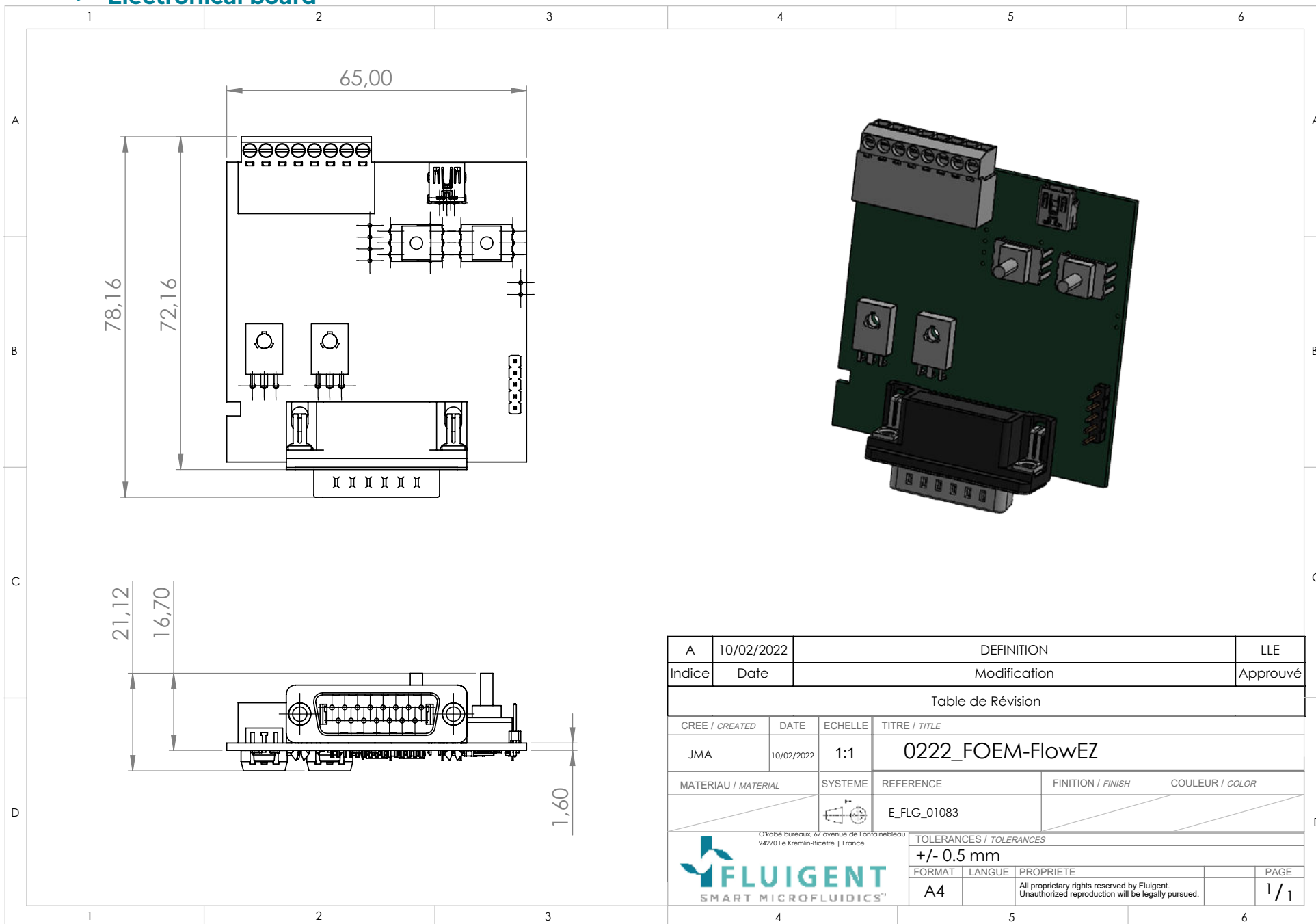
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• Valves

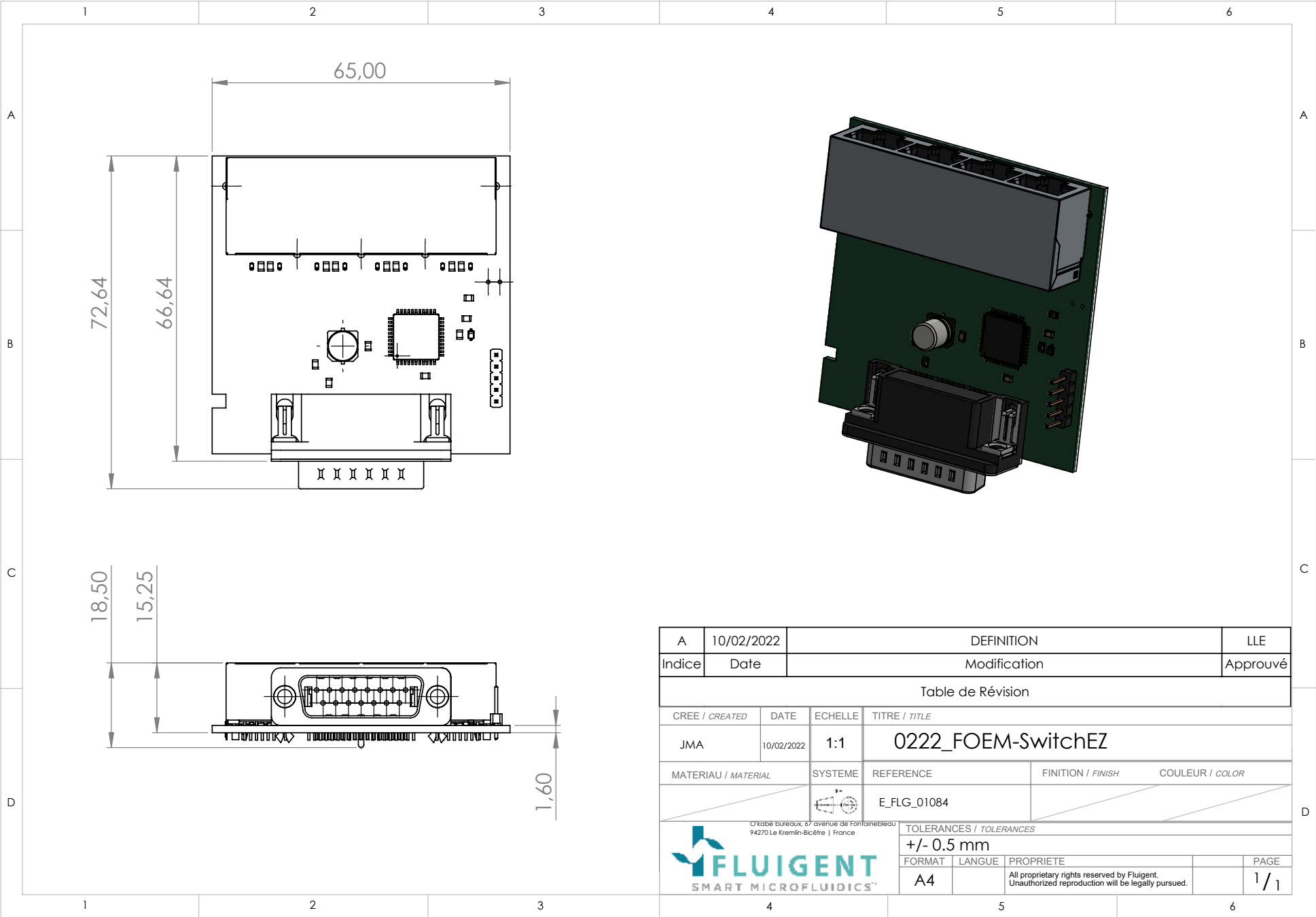


2. Pressure module

- Electronical board



3. Switch module



4. Electrovalve module

