User Manual and Datasheet

P-OEM

V 2.0

Contents

·   Warning sign

·   Caution sign against exposing electric components to water or other liquids

Warnings

- Prevent foreign objects or liquids from entering the **P-OEM**, this may cause a short-circuit failure or other malfunction.

- For P-OEMs with moisture control tubes, make sure the tube is ventilated adequately to prevent condensation droplets from forming.

- Connect the 2 power cables to the correct voltage

- Do not place the product in an unstable location, place the unit in a location with a level surface and a strong and stable support

  Not respecting the **WARNINGS** could:

  - Expose you to direct current/voltage in case the device is under voltage which may lead to severe damages

  - Void device's warranty

  - Discharge our company from any liability regarding physical or device damages

INTRODUCTION

The P-OEM is a pressure-based flow controller for microfluidic and nanofluidic applications (microchannels, nanochannels, capillaries, lab on chip...). It offers excellent response time, pulseless and highly stable flow conditions for high precision industrial microfluidic applications. In addition, contamination is drastically reduced since the transferred liquid is not in contact with the instrument.

The multi-channel design is highly compact and configurable: ranging from 1 to 8 channels, with optional on-board pressure and/or vacuum source and other possibilities.

The advanced multi-channel flow-rate control software module combined with the FLOWELL device makes it possible to have full control on flow-rates in any coupled multi-channel configurations, while keeping the benefits of pressure actuation. The P-OEM Module offers low cost of ownership and relies on the patented pressure-based FASTAB™ technology.

GENERAL INFORMATION

1.1 General functioning

The flow controllers **MFCS™-EZ series** and **P-OEM** versions enable the flow actuation of fluids by pressure regulation. The principle is based on the pneumatic pressurization of reservoirs (external reservoirs as well as disposable cartridges or integrated wells) containing the fluids to be injected in the microfluidic systems.
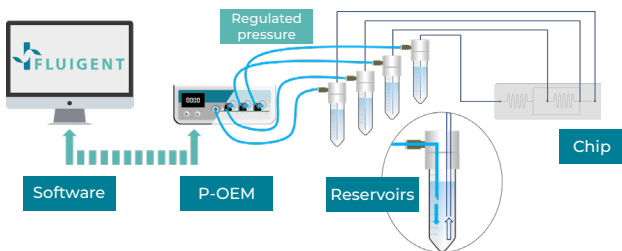
The original pneumatic path combined with a very fast regulation algorithm has been developed to deliver regulated pressure from a pressure source. The principle of pressure actuation in microfluidic systems is shown in the figure above and the benefits of this technology are listed below.

The principle of pressure actuation is described hereafter:

1. Output pressures are controlled thanks to a dedicated software, **A-i-O** (All-in-One Fluigent Software).
2. The pressure actuators immediately and automatically provide the requested pressures with very high stability thanks to a feedback loop.
3. Connecting the pressure outputs to airtight reservoirs provides precise and smooth control of the sample flow into the microfluidic device.

1.2 P-OEM pressure range

Different types of **P-OEM** depending on the pressure ranges are available. One can mix together different pressure ranges.

Pressure range (mbar)	25	69	345	1000	2000	25	69	345	800	7000
P-OEM	Low pressure					Vacuum				High pressure
Connector	Female luer lock									4 mm instant connector

1.3 Contents

The **P-OEM** package contains the following items, excluding advanced configurations:

- One P-OEM unit (with the different pressure channels)

- Optional USB or RS232 cable

- Optional P-OEM pneumatic connection kit (luer to barb adaptors, soft tube, back flow filters)
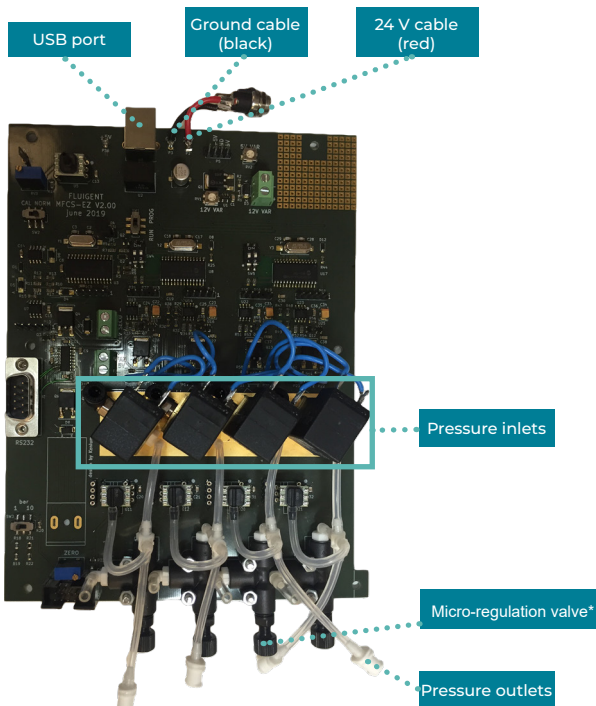
- The user manual

- Optional power supply 40W or other

- Optional Fluigent software platform in a USB stick

If any part is missing or damaged, please contact immediately the local dealer or Fluigent (support@fluigent.com).

DESCRIPTION

USB port

Ground cable (black)

24 V cable (red)

Pressure inlets

Micro-regulation valve*

Pressure outlets

⚠ * Please do not touch the micro-regulation valves (black fittings), tampering can reduce the performance of the module

SPECIFICATIONS

NAMEPLATE

P/N: P-OEM product number
S/N: P-OEM serial number
Voltage: power supply voltage
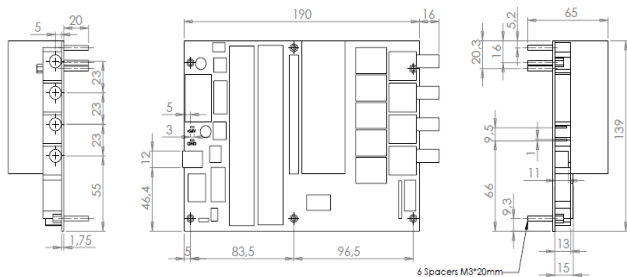
P – MODULE

P/N : 110000001
S/N : 483
Voltage : 24V
www.fluigent.com

CE

DIMENSIONS

Dimensions are all in mm, see next page for slim and large module dimensions

PERFORMANCE AND OPTIONS

Pressure ranges up to 8 on one P-OEM module: The proportional valve assembly can be configured to be on or off the circuit board	0 - 25 mbar (0.4 psi)
	0 - 69 mbar (1 psi)
	0 - 345 mbar (5 psi)
	0 - 800 mbar (12 psi)
	0 - 1000 mbar (15 psi)
	0 - 2000 mbar (30 psi)
	0 - 7000 mbar (100 psi)
	0 - (-25) mbar (-0.4 psi)
	0 - (-69) mbar (-1 psi)
	0 - (-345) mbar (-5 psi)
	0 - (-800) mbar (-12 psi)
Pressure stability	0.1% full scale - CV (on measured values)
Settling time	Down to 40ms (depends on output volume and setup)
Pressure sensor resolution	0.03% on full scale

ELECTRICAL AND MECHANICAL PROPERTIES

|	
Power input	24 VDC, Mascot connection available on demand
Current input	1.5 A
Electrical connector	Screw terminals
Connection - protocol	USB or RS232
Weight	2 Kg
Size	Slim board 19 x 9.5 x 6.5 cm (up to 3 channels)
	Standard board 19 x 14 x 6.5 cm (up to 4 channels)
	Large board 19 x 24 x 6.5 cm (up to 8 channels)
	Additional options such as air pump reduce the capacity for pressure channels / board

PRESSURE SUPPLY OPTIONS

Input pressure and flow	Requirements depend on system characteristics, up to 7.2 bars
Air consumption	The system can be configured to minimize air consumption
Pressurized media	Non corrosive or explosive gas (Ambien air, N2, Ar, CO2), oil free and dry
Optional on board pump	The module can be configured to have an on-board or off-board pressure and or vacuum pump depending on needs
Connections	Speedfit
Drying	Moisture control tube - WARNING, make sure the moisture control tube is well ventilated
	Inline air dryer

OTHER CONFIGURATION OPTIONS

|	
Pressure relief valve	Valve which will open at desired pressure min max levels includes a pressure inlet value display with flat ribbon cable attached to the P-OEM. User to integrate this signal/functionality into the system
Purge valve	Valve channels for which you require a purge, see standard configuration in on page (11), other configurations can also be realized
Flowboard	A flowboard circuit can be integrated on the module to make use of flowrate sensor input, the board can be on or off the P-OEM module
Coating	Epoxy coating

PNEUMATIC SYNOPTIC
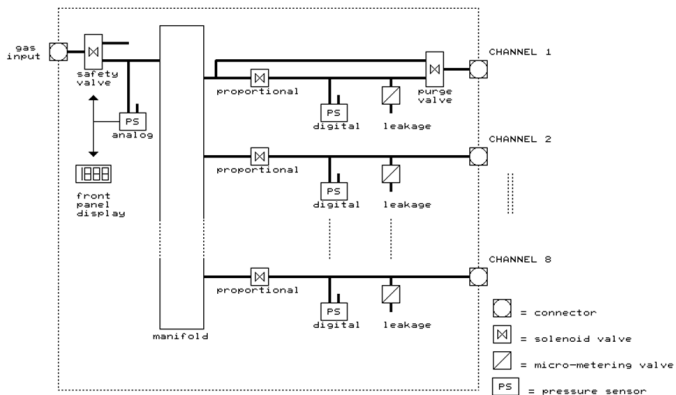
ELECTRONIC SYNOPTIC
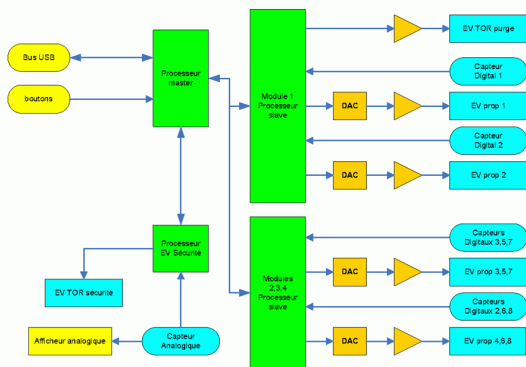
RS232 INTERFACE

The RS-232 interface is a 9-pin D-Sub socket used for remote communication. The voltage level is ±10 V (pin 5: GND; pin 2: RX +-10V; pin 3: TX +- 10V).

Settings for the Serial parameters

Serial Communication parameters should be set as follows:

Baud Rate	115200 bps
Stop Bits	1
Parity	No parity
Flow Control	None

Remote Command Set

This remote command set is the default set available on the instrument. All commands must be terminated with a <CR>. All decimal values use the point "." as decimal separator.

A query command ends with a question mark "?" for queries. The data column represents the response of the instrument. All response strings are terminated with a <CR>. Any response that have multiple parameters return the parameters separated by commas ",".

For all commands (no question mark "?"), the data column represents the required parameters to be sent to the instrument following the string in the command column. Any command that requires multiple parameters must have the parameters separated by commas ",". In case of error in the commands spelling, the command is ignored by the instrument without error code returned.

Commands/Queries related to an instrument connected at index "X" return "ERROR NO MODULE" in case there is no instrument at the index they refer to.

Command/Query	Data	Function/Response
SYST		
:IDN?	<vendor> <instrument> <serial number> <version number>	Returns the identification string. SN and VN are in decimal and on 5 characters.
:STATUS?	<status>	Returns the instrument status: 1 = On, 2 = Off
:X:IDN?	<vendor> <instrument> <serial number> <version number>	Returns information about the instrument at index X

SN and VN are in decimal and on 5 characters. |
| :X:STATUS? | <instrument> <status> | Returns information about the instrument at index X

1= Normal, 2= Under pressure, 3= Over pressure |
:START		Powers the LINK module
:STOP		Powers off the LINK module
:SETBR:<value>		Change baudrate 0=9600, 1=19200, 2=38400, 3=57600, 4=115200
:MEAS:ALL:P?	<pmeasure1> ... <pmeasure n>	As many pressure measurements as there are connected instruments
:MEAS:ALL:Q?	<qmeasure1> ... <qmeasure n>	As many flowrate measurements as there are connected instruments with a FLOW UNIT

Returns "ERROR NO Q SENSOR" in case no connected instrument has a FLOW UNIT |

Table 2 – SYST remote commands set

Command/Query	Data	Function/Response
CHAN		
X:CONF:P?	<pmin> <pmax> <mode>	Returns information about the instrument at index X pmin = pressure min, in mbar, as an integer pmax = pressure max, in mbar, as an integer mode = pressure control mode, 0 = fast, 1 = smooth
X:CONF:Q?	<qmin> <qmax> <qtable>	Returns information about the instrument at index X qmin = flowrate min, in ul/min, as decimal qmax = flowrate max, in ul/min, as decimal qtable = calibration table 0= H2O, 1=IPA, 2=HFE, 3=FC40, 4=OIL
X:P:<value>		Sets pressure order for instrument at index X
X:Q:<value>		Sets flowrate order for instrument at index X
X:MODE:<value>		Changes pressure control mode for the instrument at index X.
X: MEAS:P?	<pmeasure>	Returns pressure read by instrument at index X
X:MEAS:Q?	<qmeasure>	Returns flowrate read by instrument at index X Returns "ERROR NO Q SENSOR" in case the instrument at index X has no FLOW UNIT
:X:ZERO		Pressure sensor calibration (to atmospheric pressure)
:X:SCALE:<value>		Sets the flowrate table of the FLOW UNIT of the connected instrument at index X
:X: EVO|EVI:ON|FF		Manual control of the electrovalves of the instrument connected at index X
:X:EPI:<value>		Manual control of the input electrovalve of the instrument connected at index X. Value must be provided in hexadecimal 4 digits, ranging from 0000 to FFFF (corresponding to 0% to 100%) Note: the is no such feature for the leakage EV

Table 3: CHAN remote commands set

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Warranty terms

What This Warranty Covers

- This warranty is granted by Fluigent and applies in all countries
- Your Fluigent product is guaranteed for one year from the date of delivery at your laboratory against defects in materials and workmanship
- If found to be defective within the warranty period, your Fluigent product will be repaired or replaced free of charge

What This Warranty Does Not Cover

This warranty does not cover routine maintenance, or damage resulting from the failure to maintain the product in accordance with instructions provided by Fluigent. This warranty also does not cover damage that arises from accidental or intentional misuse or abuse, alteration or customization, or repaired by unauthorized persons.

How to Get Service

If something goes wrong, contact the Fluigent dealer from whom you purchased your product. Arrange a mutually convenient time for Fluigent service representative to discuss over the problem and find a solution to fix the issue. Will be favored any remote repairs, but in case more actions need to be taken, the system will come back to Fluigent offices (for no additional cost, only if it is under warranty).

The P-OEM warranty conditions are:

- Do not apply a higher inlet pressure than the value advised by Fluigent
- Do not use oil pump
- Do not use any corrosive or toxic gas
- Use a dry and clean gas
- Do not use other cables than cables provided by Fluigent
- Prevent foreign objects or liquids from entering the P-OEM and from spattering on the electronic card
- Connect the 2 power cables to the correct voltage
- Do not place the product in an unstable location, place the unit in a location with a level surface and a strong and stable support
- Do not treat the P-OEM in order the clean it (autoclave)
- Do not apply any electricity voltage on the P-OEM
- Respect the temperature compatibility (from 5°C to 50°C)

Contacts

Technical support

Still have questions? E-mail us at:
underline@support@fluigent.com

or call our technical support team directly:

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http://www.fluigent.com/faqs/

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