19-A Clinton Dr., Hollis, NH 03049
Ph: (603) 921-5300
PNEUCLEUS TECHNOLOGIES LLC

Operating Instructions:

The MicroFlo model EPC use a 9-pin D-Sub connector that is configured with the following pin-outs. Note that an "a" or a "b" means either a or b, depending on configuration:

Pin #	Description	Symbol	User Selectable Configuration
1	Input Power	V+	(+12V, +15V or +24V)[1]
2	Control Signal	Vc	(0-5V, 0-10V, 1-5V, or 4-20mA)[1]
3	Flow Signal Out	Vo	(0-5V, 0-10V, 1-5V, 1-10V)
4a	Purge	Pg	Apply a ground to open valve full to purge gas line.
4b	RS232 Transmit	Tx	RS-232 Transmit out for RS-232 Configured EPC's
5	Power Ground	Gp	Valve & Heater Return & RS232 Ground Reference
6	Signal Ground (Vc)	Gsc	Control Signal Ground Reference
7	Signal Ground (Vo)	Gso	Flow Signal Out Ground Reference
8	Custom Control	Cc	Custom Feature Enable (4-20mA Return)
9a	Cal Select	Cs	Ground for Cal-A; Open for Cal-B / RS232 Rx-in
9b	RS232 Rx	Rx	RS-232 Receive in for RS-232 Configured EPC's

Input Power (Pin-1): The EPC operates for a single power supply and its voltage must not fall more than 5% below the rated input voltage for proper operation. If a lower voltage EPC is desired contact the factory.

Control Signal (Pin-2): The control signal is an analog signal used to "Set" the desired pressure. This signal must be referenced to signal ground, precise and drift-free. If the control signal at the EPC connector is not accurate and drift-free it will be a source of erroneous pressure performance.

Flow Signal Out (pin-3): This signal is an analog output voltage from 0-5V, which represents the rate of pressure being controlled by the EPC. The percentage that the Flow Signal Output voltage to its full range (5V) is the percentage of the flow set point is to its full-scale range. For instance, if Vo = 625mV and the full-scale flow range of the EPC is 100KPA then the current pressure is 0.625V/5V*100KPA = 12.5 KPA. The accuracy of this signal is represented by the linearity specification of the unit purchased.

RS-232 Tx (pin-4): This pin is configured for one of two functions. The PURGE function allows the gas line to be purged of foreign gases that get into the gas line when gas bottles are changed or other disruption to the gas line occurs. Apply a ground potential to this pin and the internal valve opens full to flood the gas line with the desired gas. The RS-232 Tx function allows RS232 communication where this pin transmits the RS232 signal to a computer via hyper terminal. This pin should be connected to the Receive pin on the computer's serial connector. If RS232 is configured then the PURGE function is available & enabled by an RS232 "command".

Power Ground (pin-5): Provides a direct return for the valve current, heater current, RS-232 digital-ground reference. Signal Ground is also tied to this pin right at the connector.

Signal Ground (pin-6/7): The signal grounds are tied together inside the EPC so there is no requirement to assign Gsc or Gso to a particular signal ground pin. Signal Ground is tied to power ground right at the D-Sub connector.

Custom Control (pin-8): This pin is reserved for any custom control features that may be requested by the customer (i.e. 4-20mA Return, Valve-Off, Pressure Sensor Output, Flow Sensor Output, Others…)

[1] User selected when ordering

RS-232 Rx (pin-9): The Cal-Select pin is used to select CAL-A or CAL-B on those EPC that have two calibrations. If a single calibration EPC was purchased then there need not be a connection to this pin at all. If the RS232 capability was configured then this pin serves as the "Receive" (Rx) for the on-board uP. This pin should be connected to the Transmit pin on the computer's serial connector. If RS232 is configured then the Cal-Select function is enabled by an RS232 command.

Gas Connections: The EPC accepts 10-32 straight thread fittings with an o'ring seal. The o'ring should be 0.320" OD with a 0.070 chord. Parker A-Lok or Swagelok SS-200-1-0157 series will work. Connect gas so that the flow is in the direction of the arrow label on the side of the EPC.

Performance: Refer to the Performance Specification on the Internet at www.pneucleus.com

4-20mA Configuration: Units configured for 4-20mA will accept a 4-20mA current into Pin-2 of the DB9 to linearly control its flow or pressure. The 4-20mA read back signal is sourced by an internal amplifier whose output is on pin-3 of the DB9, fed through the ***users*** sense-resistor and must return to Pin-8 of the DB9 to complete the loop. The 20mA current must not result in a voltage measured at Pin-2 of the DB9 to exceed 5.25V. The voltage measured at pin-3 of the DB-9 can rise to two volts (2V) less than the input voltage of the device (Pin-1 of the DB9). For a +24V unit the impedance seen by Pin-3 of the DB9 cannot exceed 750 ohms.

Cal Select Jumper:

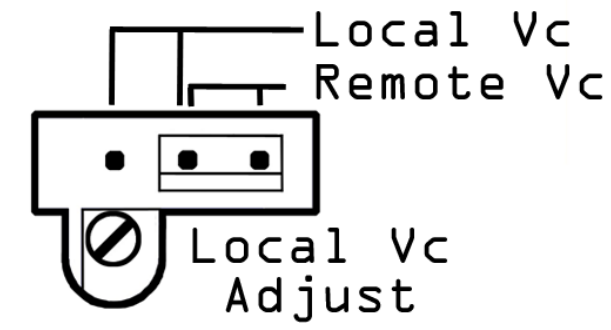
This jumper is located on the top of the unit, to the right of the D-sub connector if you are looking at the EPC with the label containing the Pneucleus part number and Serial number facing you. As Shown in figure 1, Cal A is engaged when the jumper is not shorted, and Cal B is engaged when the jumper is shorting the 2 pins. If the unit is in Analog user mode, explained below, the jumper must be used to select the active calibration, if the unit is in RS-232 user mode, the jumper only determines what calibration the unit uses by default, that is, at start up. Once the unit is powered on the user must switch the active calibration via a software command, detailed in the RS-232 User mode section.

Analog User Mode:

The EPC can be operated in 2 configurations, local or remote-control mode, depending on the position of the jumper shown in figure 1. With the jumper in Remote Vc mode the unit will respond to control voltage applied to Pin 2 in the range outlined on the label. With the jumper in the Local Vc position, the EPC will be set according to the voltage set by the Local Vc Adjust potentiometer. This is done by the end user monitoring the Flow Out reading on Pin 3, and adjusting the potentiometer until the desired Flow rate is achieved.

For example: If your EPC has a full-scale pressure of 100 KPA and the voltage range of the unit is 0-5 V and you wish to set a pressure of 50 KPA, you would adjust the potentiometer until the output on Pin 3 is equal to 2.5 volts.

Figure 1:



RS232 User Mode:

Serial Port Set-Up: 8-Bit, Baud Rate: 9600, Parity: None, Stop Bit: 1

Upon power-up you will receive no prompt from the EPC on your monitor. You must initiate communication first by typing the Default Address followed by a comma and a command… The Factory Default Address is ID0 and to initiate communication exchange we recommend entering "ID0,M" to bring up the Command Menu…

Enter "?" following the commands below for a brief explanation of the purpose of the command…

For Example: "ID0,S" will display the current pressure setting.

…So, "ID0,S50" Enters a Set-point of 50 KPA …AND

"ID0,S100" would enter a Set-point of 100 KPA

User Menu

M - show menu

DUMP - dump menu

S - set pressure

R - read pressure

V - set valve

P - set purge

C - pressure units (0=kPa, 1=Torr, 2=psia, 3=%FS, 4 = %Vac)

D - set default powerup (0=min, 1=last, 2=max, 3=atm)

I - set unit ID

N - set unit name

U - show unit info

A - set addr/verbose

ADP - set atm. default pressure

ACP - set atm. current pressure

Example: To set a pressure of 50 KPA enter ID0,S50 <return>

Example: For the EPC to read-back the current flow rate enter: ID0,R <return> Response: 50.02