Made in U. S. A.
Specializing in Direct-Sensing Mass Flow Controllers
PNEUCLEUS TECHNOLOGIES LLC
169 Depot Road, Hollis, NH 03049 Ph: (603) 465-7346 Fx: (603) 465-3594

Operating Instructions:

The MicroFlo and MediFlo model MFC's use a 9-pin D-Sub connector that is configured with the following pin-outs. Note that #a & #b mean 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 MFC'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
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 MFC's

Input Power (Pin-1): The MFC 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 MFC is desired contact the factory.

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

Flow Signal Out (pin-3): This signal is an analog output voltage from 0-5V, which represents the rate of flow being controlled by the MFC. 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 MFC is 2 SLPM then the current flow rate is 0.625V/5V*2SLPM = 0.250 SLPM. The accuracy of this signal is represented by the linearity specification of the unit purchased. Since the MicroFlo's base-model MFC's are not linearized (with the exception on Helium and Hydrogen) this correlation does not follow as accurately. A Test Data Sheet can be purchased with the MicroFlo to accurately resolve flow rate information using the piece-wise linear equation provided on the data sheet.

Purge/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".

[1] User selected when ordering

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 MFC 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. Valve-Off, Pressure Sensor Output, Flow Sensor Output, Others…)

Cal-Select (pin-9): The Cal-Select pin is used to select CAL-A or CAL-B on those MFC's that have two calibrations. If a single calibration MFC 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 MFC 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 MFC.

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

RS232 User Menu:

Hyper Terminal Set-Up: 8-Bit, Baud Rate: 9600, Parity: None, Stop Bit: 1

Upon power-up the following query appears on the monitor…

Please enter password... (type 'x' and RETURN to exit)

Default Password = 7346 and can be changed by the customer…

Connected to Digital MFC User Menu...

Serial Number: XXXX

Part Number: MCD-XXXXXXXXXX-XX

Software Rev. 7.11

Enter "?" to display user menu and function…

User Menu:

- S Command: Flow Set Point (Sxx.xx/S, xx.xx in sccm)
- R Command: Flow Read (R)
- V Command: Valve (V0/V1/V)
- P Command: Purge (P0/P1/P)
- C Command: Cal Select (CA/CB/C)
- D Command: Default Select (D0/D1/D)
- E Command: Exit
- ? Command: Examples

Example: to set a flow of 430 sccm enter S430 <return>

Example: to select Cal-B enter CB <return>

Example: to have the MFC read-back the flow rate enter: R <return> Response: 430 sccm (86% FS)