**Procedure to Set a Pressure Set-point on the MKS T3BiA Valve**

\* Note that most of these steps do NOT have to be done each time. However performing the checks is a good idea. The only essential steps are those that explicitly set the set-point and precision

Enter the following commands into PuTTy to communicate with the valve. These are also used through RS232 communication via LabView. **Bold** are entered exactly, *italics* indicates you need to enter a custom number. Any command with **R***#* is a diagnostic which returns information. Two methods of pressure control are available, model based and proportional-integral-derivative. Commands specific to model based are orange; commands specific to PID are purple.

* Set pressure control type (see T3BiA Manual for explanation)
  + **V0** (for model based)
  + **V1** (for PID)
  + **R51**
* Set pressure units to Torr
  + **F00**
  + **R34**
* Set pressure range for high sensor (labeled on valve) to 1000Torr
  + **EH10**
  + **R33**
* Use LEARN to get system characteristics for Model Based control (while gas is flowing through the system)
  + Enter chamber volume
    - **CAL1234**
    - **SVO***588* (588 liters estimated for the tank)
    - **RVO**
    - **USR**
  + Leave volume estimator on
    - **CAL1234**
    - **SVE1**
    - **RVE**
    - **USR**
    - **ROM**
  + Request suggested flow
    - **RLE**
  + Set actual flow ***\*optimize***
    - **SLF***120* (120 liters at STP per minute estimated)
  + Learn the valve
    - **L**
  + Review pump speed data
    - **RCD2**
* Set pump speed compensation parameters
  + **SUE1**
  + **RUE**
* Set speed-up compensation
  + **SUT***0.02* (0.02 second delay for baratron estimated) ***\*optimize***
  + **RUT**
* Set speed-up filter
  + **SUF***0.01* (# should be 3-10 times less than number for SUT) ***\*optimize***
  + **RUF**
* Make a pressure set-point
  + **T***1***1 (**1st number indicates set-point (1-6). 2nd indicates pressure control)
  + **R***26* (# indicates setpoint (26 for 1, 27 for 2, etc.) )
* Make this set pressure to be 100 Torr (i.e. 10% Full scale range)
  + **S***110* (1st number indicates set-point (1-6). 2nd indicates pressure as % full-scale range)
  + **R***1* (# indicates set-point (1-6))
* Set rate at which flow adjusts to desired pressure
  + **I***1100* (1st number indicates set-point (1-6). 2nd indicates speed as % [leave at 100])
  + **R***15* (# indicates set-point (15 for 1, 16 for 2, etc.) )
* Set threshold to within 0.1% desired pressure ***\*optimize***
  + **P1***0.01* (1st number indicates low-threshold for process limit 1. 2nd number is % of full scale range. To control w/in 0.1% this number is: 0.001 \*(Pdesired/PFullRange)\*100 ). Limited to 4 decimal places
  + **R110** reports the above number
  + **P2***0.01* (Same as above, but for high-thresh limit. Sub **1** & **2** for **3** & **4** for 2nd set-point). Limited to 4 decimal places
  + **R120** reports the above number
* Activate set-point
  + **D***1* (# indicates set-point (1-6))
  + **R***7* (# indicates set-point (7 for 1, 8 for 2, etc.) )
* Report pressure (as % full scale range)
  + **R5**
* Report valve position (as % open)
  + **R6**
* Set Gain
  + Mx# (x=1 for set-point 1, # is between 0-32767) [Used Gain=5 for dP=0.1%P, P≥ 80Torr]
  + Rxx reports the gain (xx=46 for set-point 1, 47 for set-point 2, etc.)
* Set Phase
  + **X***x#* (x=1 for set-point 1, # is between 0-32767)[Used Phase=5 for dP=0.1%P, P≥80Torr]
  + **R***xx* (xx=41 for set-point 1, 42 for set-point 2, etc.)