PMAC Position Registers

The PMAC Executive position window or the online P command reports the value of the actual position register plus the position bias register plus the compensation correction register, and if bit 16 of Ix05 is 1 (handwheel offset mode), minus the master position register:

\[
P100 = \frac{(M162 + M164 + M169 - M175 \times M167)}{I108 \times 32}
\]

P100 will report the same value as the P online command or the position window in the PMAC Executive program. The addresses given are for Motor #1. For the registers for another motor x, add (x-1)\*$3C – (x-1)*60 – to the appropriate motor #1 address.:

M161->D:$0028 ; #1 Commanded position (1/[I108*32] cts)

The motor commanded position registers contain the value in counts where the motor is commanded to move. It is set through JOG online commands or axis move commands (X10) inside motion programs. To read this register in counts:

\[
P161 = M161 / (I108 \times 32)
\]

M162->D:$002B ; #1 Actual position (1/[I108*32] cts)

The actual position register contains the information read from the feedback sensor after it has been converted properly through the encoder conversion table and extended from a 24-bits register to a 48-bits register. To read this register in counts:

\[
P162 = M162 / (I108 \times 32)
\]

M163->D:$080B ; #1 Target (end) position (1/[I108*32] cts)

This register contains the most recent programmed position and it is called the target position register. If I13>0, PMAC is in segmentation mode and the value of M163 corresponds to the last interpolated point calculated. To read this register in counts:

\[
P163 = M163 / (I108 \times 32)
\]

M164->D:$0813 ; #1 Position bias (1/[I108*32] cts)

This register contains the offset specified in the axis definition command #1->X + <offset>.

The \{axis\}={constant} online command or the PSET motion program command adds the specified offset to the existing M164 offset:

\[
M164 = M164 + <new_offset>.
\]

To read this register in counts:

\[
P164 = M164 / (I108 \times 32)
\]

M165->L:$081F ; &1 X-axis target position (engineering units)

M165 contains the programmed axis position through a motion program, X10 for example, in engineering units. In addition, it is updated by the \"{axis}={constant}\" online command or the PSET motion program command.

M166->X:$0033, 0,24,S ; #1 Actual velocity (1/[I109*32] cts/cyc)

M166 is the actual velocity register. For display purposes, use the Motor filtered actual velocity, M174.

To read this register in cts/msec:

\[
P166 = M166 \times 8388608 / (I109 \times 32 \times I10 \times (I160+1))
\]

M167->D:$002D ; #1 Present master (handwheel) pos (1/[I107*32] cts of master or (1/[I108*32] cts of slaved motor)
M167 is related to the master/slave relationship set through Ix05 and Ix06. It contains the present number of counts the master.

To read this register in counts:

\[ P167 = \frac{M167}{(I108 \times 32)} \]

or

\[ P167 = \frac{M167}{(I107 \times 32)} \]

M169 -> D: $0046

; #1 Compensation correction

Calculated leadscrew compensation correction according to actual position (M162) and the leadscrew compensation table set through the define comp command.

To read this register in counts:

\[ P169 = \frac{M169}{(I108 \times 32)} \]

M172 -> L: $082B

; #1 Variable jog position/distance counts

Contains the distance for the J=* command.

**Example:**

M172 = 2000 J=* ; Jog to position 2000 encoder counts

M173 -> Y: $0815, 0, 24, S ; #1 Encoder home capture offset (counts)

Contains the home offset from the reset/power-on position. Important for the capture/compare features.

**Example:**

If (M117 = 1)

\[ P103 = M103 - M173 \]

; Captured position minus offset

M174 -> Y: $082A, 24

; #1 filtered actual velocity (1/[Ix09*32] cts/servo cycle)

These registers contain the actual velocities averaged over the previous 80 real-time interrupt periods (80*[I8+1] servo cycles); good for display purposes.

To read this register in cts/msec:

\[ P174 = \frac{M174 \times 8388608}{(I109 \times 32 \times I10 \times (I160 + 1))} \]

M176 -> D: $0840

; #1 following error (1/[Ix08*32] cts)

Following error is the difference between motor desired and measured position at any instant. When the motor is open-loop (killed or enabled), following error does not exist and PMAC reports a value of 0.

\[ P176 = \frac{(M161 - M162 + M164 = M169 \times M167)}{I108 \times 32} \]

To read this register in counts:

\[ P176 = \frac{M176}{(I108 \times 32)} \]