

PEPPEx

The following sections describe the PV names for PEPPEx motion control stage. The device is composed of two movable axis. One in Y direction with a total movable range of 82 mm and one in X axis with total movable range of 8 mm.

Y Axis:

The Zone plates are on the Y axis. Only one at a time can be inserted. There are 4 zone plates, ordered from the first inserted to the last as the actuator moves from its nominal "Zero" position. Zero position is at the out/upper limit switch and the axis moves in negative direction as it grows into the beam.

PVs related to mover as a whole

MOVR:UNDS:5013:Y:ENABLE	Enable motor torque
MOVR:UNDS:5013:Y:ENABLEDSTAT	motor torque status
MOVR:UNDS:5013:Y:MOTR.VAL	motor record - requested position
MOVR:UNDS:5013:Y:MOTR.RBV	motor record - readback position
MOVR:UNDS:5013:Y:Moving	Binary PV indicating if mover is moving or not
MOVR:UNDS:5013:Y:EncRdbk	BissC Encoder Readback
MOVR:UNDS:5013:Y:EncOffset	Absolute Encoder Offset
MOVR:UNDS:5013:Y:DISABLE	Disable motor torque

X Axis:

The actuator moves in negative X direction towards the aisle. The nominal Zero position will be the center of the first inserted zone plate into the beampath.

PVs related to mover as a whole

MOVR:UNDS:5013:X:ENABLE	Enable motor torque
MOVR:UNDS:5013:X:ENABLEDSTAT	motor torque status
MOVR:UNDS:5013:X:MOTR.VAL	motor record - requested position
MOVR:UNDS:5013:X:MOTR.RBV	motor record - readback position
MOVR:UNDS:5013:X:HomeOffset	Distance from beam centerline to aisle limit switch
MOVR:UNDS:5013:X:Moving	Binary PV indicating if mover is moving or not
MOVR:UNDS:5013:X:EncRdbk	BissC Encoder Readback
MOVR:UNDS:5013:X:EncOffset	Absolute Encoder Offset
MOVR:UNDS:5013:X:DISABLE	Disable motor torque

Test Information from B31

X axis maximum speed attained 1mm/sec

Y axis maximum speed attained 0.75mm/sec

When X axis moves in CW direction (looking at the rear shaft of the motor or looking from aisle side) the paddle moves into the beam.

Data from alignment (Pre installation from B31)

Zone Plate 0 center	0	-31.7783
Zone Plate 1 center	-0.0194	-46.2797
Zone Plate 2 center	0.1694	-60.3538
Zone Plate 3 center	0.4287	-74.7899

Motion End of Travel limit positions from alignment (Pre installation from B31)

Y Axis Motion End of travel limit (Top)	0
Y Axis Motion End of travel limit (Bottom)	-81.5293
X Axis Motion End of travel limit (CCW label)	4.0418
X Axis Motion End of travel limit (CW label)	-4

MPS limit positions from alignment (Pre installation from B31)

MPS Out	0	-3.8244
MPS 0	-28.262	-35.799
MPS 1	-42.611	-50.221
MPS 2	-56.988	-64.621
MPS 3	-71.380	-78.655

IOC Configuration

sioc-unds-mc03	IOC Name
moc-unds-mc48	MOC Name
motion/motionApp	source code location
acsw-unds-nw50	port 1

Aerotech requirements

resoluteEncoder.abi reads back data from DRIVEINFO field ResoluteAbsolutePosition. This program needs to be autorun in Task1 so that data can be read in EPICS

parameterNames.cfg must be loaded in the file system

Aerotech parameters setup

X axis

Counts/unit

Encoder = 50nm resolution => 1 count of encoder = $5 \cdot 10^{-5}$ mm

In Aerotech for mm as unit

Counts/unit = $1 / (5 \cdot 10^{-5}) = 20000$

Counts/rev

1 motor revolution = 1.27 mm

=> $20000 \times 1.27 = 25400$

Parameters that affected in lowering the chripping noise

Running current = 0.5A

Holding current = 0.2A

Stepper Damping Cut off = 150

Y axis

Counts/unit

Encoder = 50nm resolution => 1 count of encoder = 5×10^{-5} mm

In Aerotech for mm as unit

Counts/unit = $1 / (5 \times 10^{-5}) = 20000$

Counts/rev

Y axis seems to have a gear reducer 5:1 added

5 motor revolution = 1.27 mm

=> $20000 \times 1.27 / 5 = 5080$

Parameters that affected in lowering the chripping noise

Running current = 2A

Holding current = 0.5A

Stepper Damping Cut off = 80

Max Speed

X axis maximum speed attained 1mm/sec

Y axis maximum speed attained 0.75mm/sec

Error Thresholds

InPositionDistance (the position error threshold below which an axis is considered to be in position) for both axis 10-5 mm

InPositionTime (quantity of time that the position error of the axis must be less than InPositionDistance) = 500 sec

PositionErrorThreshold (maximum allowable position error (the difference between the position command and the position feedback) before a position error fault is generated.)

1mm