Arm Position & Control

Coordinate system origin for the arm is the shoulder joint

Θ – arm angle, ranges from -60° to 180°, -60° is the pose with the arm in the starting position

Ø – gripper angle, ranges from 0° to 120°, 0° is when the gripper is attached straight out, 45° is with the gripper tilted up

Ω = Θ+ Ø - arm & gripper angle for computing position of end gripper

armLength – The arm length from the shoulder joint to the end where the gripper is attached.

24” – Length of the pneumatic extension for the arm.

gripperLength – The length of the gripper from the point where it attaches to the arm

frameLength – length of the frame, front to back, will start with a length of 31”

armJointPosition – length from the end of the frame to the center of the shoulder joint, will start with a length of 16”

16” – Allowed extension to frame perimeter

Spread Sheet

I just estimated the parameters for the armLength, armJointPosition, gripperAngle, and gripperLength. I’ll be down to measure those so I can get some exact estimates.

Column A has the various arm angles from -60 to 180.

Column B is the distance along the x-axis of the distance from the shoulder joint to the end of the arm.

Column C is the distance along the x-axis of the distance from the shoulder joint to the end of the arm with the arm extended.

Column D is the gripper length along the x-axis measured from the end of the arm to end of the gripper. The angle used is the sum of the arm angle along with the gripper angle.

Column E is the length along the x-axis of both the arm and gripper with the arm NOT extended.

Column F is the distance from the end of the frame to the end of the gripper. A negative number means that the end of the gripper is not at the edge. Green indicates legal positions.

Column G is the distance from the end of the 16” extension to the end of the gripper. A negative number means that the end of the gripper is not at the edge. Green indicates legal positions.

Columns H, I, and J are defined the same as E,F, and G except for with the arm extended.