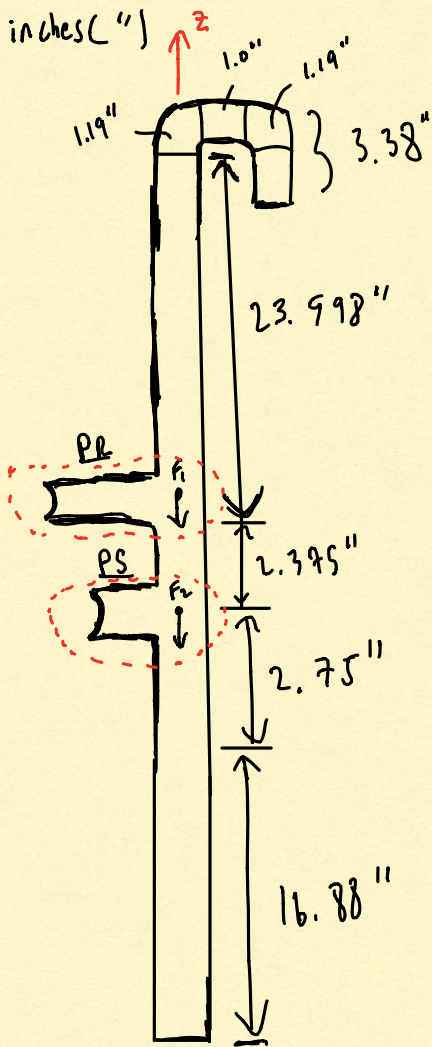
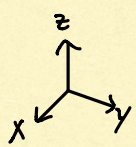


Festo Piston #1 Branch

By inches (")



Analysis

$$PR(\text{length}) = 1.19'' + 0.50'' + 2.00 = 3.69''$$

$$PS(\text{length}) = 1.20'' + 1.02'' = 2.22''$$

$$M = 0.3 \text{ pounds (lb)}$$

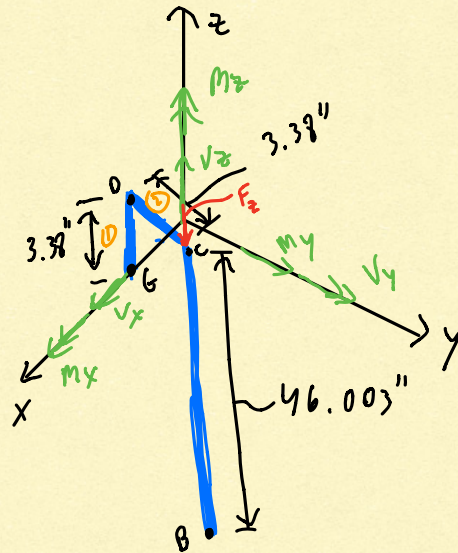
$$F_1 = (0.3 \text{ lb})(3.69'') = 1.107 \text{ lb}\cdot\text{in}$$

$$F_2 = (0.33 \text{ lb})(2.22'') = 0.7326 \text{ lb}\cdot\text{in}$$

$$\sum F_z = 0;$$

$$F_z = F_1 + F_2 = 1.8396 \text{ lb}\cdot\text{in}$$

Branch 1: Festo Piston

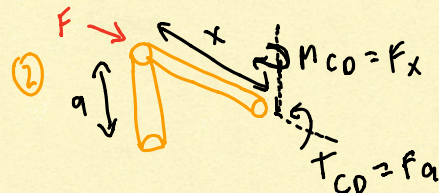
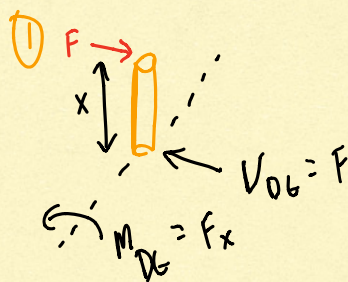


Key: $\rightarrow, V$

$\rightarrow, M$

$$F_z = 1.8396 \text{ lb}\cdot\text{in}$$

$$T_x = (3.38'')(1.8396 \text{ lb}\cdot\text{in}) = 6.2178 (\text{lb}\cdot\text{in}^2)$$

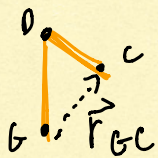


$$M = (0.40375 \text{ lb})(1.69'') = 0.6823 \text{ lb}\cdot\text{in}$$



Soldered Piston Branch

continued....



$$\begin{aligned}\vec{r}_{GC} &= C(0, 3.38, 3.38) \\ &\quad - G(0, 0, 0) \\ &= (3.38\hat{j} + 3.38\hat{k})\end{aligned}$$

$$\vec{F} = \frac{0\hat{i} + 0\hat{j} - 1.8396\hat{k}}{\sqrt{1.8396^2}} = -1\hat{k}$$

$$M_G = \vec{r}_{GC} \times \vec{F} = \begin{bmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 3.38 & 3.38 \\ 0 & 0 & -1 \end{bmatrix}$$

$$= \underline{\underline{[-3.38\hat{i} + 0\hat{j} + 0\hat{k}] \text{ lb}\cdot\text{in}}}$$