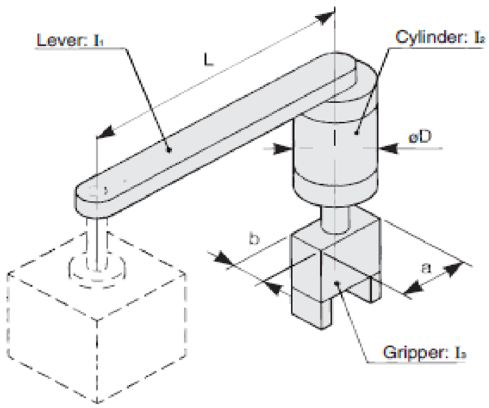
Information Required for Sizing Rotary Actuators

Operating pressure	
Angle of rotation	
Time of rotation	
Load weight	
Physical size of the load	
Load weight and size of each component for multiple unit assembly?s application (please see example #3 in the Best Pneumatics 2004 , Volume 11 p.11-1-33)	
Orientation of all components to the center of rotation	
Load diagram will be very helpful in addition to the application description.	
Following formats are in preferential order: 1) Solid Works Version 2007 or 2008 ;2) AutoCAD 2000; 3) Hand drawn sketch complete with all dimensions.	
Friction coefficient between load and sliding surface (for resistance load; see Best Pneumatics 2004, Volume 11, p.11-1-13 for reference)	

Application Example

3 If a lever is attached to the shaft and a cylinder and a gripper are mounted to the tip of the lever:



Example: Obtain the lever's moment of inertia:

$$I_1 = m_1 \cdot \frac{L^2}{3} \quad \text{kg·m}^2$$

Obtain the cylinder's moment of inertia:

$$I_2 = m_2 \cdot \frac{D^2}{8} + m_2 \cdot L^2 \quad \text{kg·m}^2$$

Obtain the gripper's moment of inertia:

$$I_3 = m_3 \cdot \frac{a^2+b^2}{12} + m_3 \cdot L^2 \quad \text{kg·m}^2$$

Obtain the actual moment of inertia:

$$I = I_1 + I_2 + I_3 \quad \text{kg·m}^2$$

(m_1: mass of lever in kg
m_2: mass of cylinder in kg
m_3: mass of gripper in kg)

Calculation Example

When L = 0.2 m, D = 0.06 m, a = 0.06 m, b = 0.03 m, m_1 = 0.5 kg, m_2 = 0.4 kg, m_3 = 0.2 kg

$$I_1 = 0.5 \times \frac{0.2^2}{3} = 0.67 \times 10^{-2} \quad \text{kg·m}^2$$

$$I_3 = 0.2 \times \frac{0.06^2 + 0.03^2}{12} + 0.2 \times 0.2^2 = 0.81 \times 10^{-2} \quad \text{kg·m}^2$$

$$I_2 = 0.4 \times \frac{0.06^2}{8} + 0.4 \times 0.2^2 = 1.62 \times 10^{-2} \quad \text{kg·m}^2$$

$$I = (0.67 + 1.62 + 0.81) \times 10^{-2} = 3.1 \times 10^{-2} \quad \text{kg·m}^2$$